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TM 676

INSTRUCTION MANUAL

TEST MESSAGE GENERATOR
TMG-10

ATLANTIC RESEARCH CORPORATION
A Division of The Susquehanna Corporation
TELECOMMUNICATION PRODUCTS DEPARTMENT

ALEXANDRIA, VIRGINIA 22314
USA

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TEST MESSAGE GENERATOR

TMG-10

February 1970

From the TELEPRODUCT® Line

of the

Telecommunication Products Department

Manufactured by

ATLANTIC RESEARCH CORPORATION
A Division of The Susquehanna Corporation
ALEXANDRIA, VIRGINIA 22314
USA

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Figure 1-1. Test Message Generator TMG-10.

SECTION I

GENERAL DESCRIPTION

The Test Message Generator TMG-10 is a precision instrument for test center or field use in testing telegraph and data transmission facilities and associated equipment. The TMG 10 generates test messages into which controlled distortion may be introduced. Distortion is variable in 5-percent increments between zero and 45 percent and may be marking bias, spacing bias, or switched bias. Each TMG-10 can contain up to two 80- or 96-character fixed test messages which are factory-programmed and a manually-programmable 2-character message. In addition the TMG-10 can transmit reversals with controlled distortion, steady spacing, or steady marking signals. Independent pushbutton switches enable any of the messages to be transmitted at any selected speed and with any selected stop element. The messages may be transmitted continuously or one character at a time. Either of the two programmable characters may be released independently. Up to nine discrete transmission speeds may be controlled by the internal clock (transmission speeds up to 50,000 baud), or an external synchronizing signal, such as obtained from a laboratory precision oscillator, may be used for additional transmission speeds up to 1,000,000 baud.

The TMG-10 contains a parity generator which is controlled from the panel to insert automatically the proper parity bit for either even or odd parity in the 7- and 8-level messages. If parity is not desired, the parity bit may be forced to either mark or space.

Standard output modes, available at front-panel jacks, are: isolated dry neutral keying (for open loop voltages up to 260 volts with protection from inductive spikes) and low-level polar voltage (EIA or MIL-188). Optional outputs available on the back panel are wet polar, wet neutral, logic level signals, and clock signal for synchronizing terminal equipment with the TMG-10. Table 1-1 gives complete specifications for the TMG-10.

The TMG-10 and a companion analyzer fit side-by-side into an MR-14 rack adapter in a standard 19-inch relay rack and occupy only 7 inches of vertical mounting space.

In addition to the normal in-service testing of transmission facilities and equipment, the TMG-10 may be used to:

Exercise I/O devices, using the optional 96-character 7-level factory-programmed message.

Check polling functions, using the standard front-panel programmable characters and the single-character release feature.

Verify operation of parity check circuits.

Check 7-level longitudinal redundancy (or "block parity"). Validity of instrument-generated block parity character may be controlled using the front-panel 2-character pushbuttons. Any bit of the longitudinal check may be forced invalid.

Adjust bias in carrier channels using transmitted distorted reversals.

Identify the transmitting station to the receiving test center. The 2-character programmable message is automatically inserted into the fixed-message transmission in the space reserved for station identification.

Table 1-1. Specifications, TMG-10.

Signal Outputs	
Standard	Dry neutral, isolated nonpolarized solid-state dry-contact keying for up to 100-milliampere neutral loops at 260 volts (maximum) open loop voltage. Protection is provided for highly inductive loops. Maximum marking drop (at 100 milliamperes) is 2 volts.
	Low-level polar voltage, either EIA or MIL-STD-188 as determined by internal jumper-clip strap. Source impedance is 180 ohms.
Optional (requires OS-1 module)	Logic level, +4 volts (source impedance 680 ohms) and ground (sinking capability 20 milliamperes). Marking sense is controlled by jumper-clip strap.
	Wet neutral or wet polar, controlled by rear-panel switch and potentiometer. Regulated current output $\leq$0.6 milliampere per 100-ohm change in loop resistance, adjustable from 10 to 65 milliamperes.
Transmission Speed	
Standard (with CS-3 module)	35-150 baud, up to eight discrete speed selections. Accuracy ±0.2 percent. (See Table 1-2.)
Optional (with CS-4 module)	10-50,000 baud up to nine discrete speed selections. Each speed is controlled by a high-stability crystal oscillator. Accuracy ±0.01 percent. (See Table 1-2.)
Externally Controlled	Up to 50,000 baud with controlled distortion. CLOCK jack allows speed control by external oscillator operating at a frequency in Hz of 20 times the signal speed in baud, 4 volts sinusoidal (rms) or pulses (positive peak) into 6,000 ohms.
	Up to 1,000,000 baud undistorted. EXT SYNC jack on rear panel accepts externally generated clock for synchronizing the TMG internally-generated signal. External oscillator must operate at a frequency in Hz equal to the signal speed in baud, 3 volts (nominal) positive pulses into 225 ohms.
Code Level	5-, 6-, 7-, and 8-level start-stop.
Stop Element	Four discrete stop element selections: 1.00, 1.45, 1.50, and 2.00, selected by pushbuttons on front panel.

Table 1-1. Specifications, TMG-10. (Cont'd)

Messages	Two fixed-program messages (up to 80 coded characters). Standard messages are 5-level fox and 8-level fox. A 96-character (including pause) 7-level exerciser message and other messages available on special order. Manually-programmable message of two characters. The two characters are incorporated into each fixed-message transmission as sending station identification. The two-character message also may be transmitted independently. Fixed or manually programmable messages may be transmitted continuously or stepped one character at a time. Reversals Mark hold Space hold
Distortion Capability	Zero to 45 percent, adjustable in 5-percent increments Marking bias, spacing bias, and switched bias
Synchronizing Output (requires OS-1 module)	INT CLOCK jack on rear panel provides pulses from the instrument clock for synchronizing external equipment. Pulses are at twice signal speed (i.e., have a frequency in Hz equal to the signal speed in baud).
Power Requirements	115 or 230 volts ac ±10 percent, 50-60 Hz, 50 watts
Size	9 1/2 (wide) by 6 5/8 (high) by 12 (deep) inches, including handle
Weight	10 1/4 pounds
Temperature	0 to 55°C
Rack Mounting	Mounts in half of 19- by 7-inch MR-14 mounting rack adapter (A companion analyzer may be mounted in other half of rack adapter.)

Table 1-2. Transmission Speeds of Various Clock Source Modules.

CS-3-1:	45.5, 50.0, 56.9, 66.7, 74.2, 110, 134.5, and 150 baud
CS-4-1:	45.5, 50.0, 56.9, 66.7, 74.2, 110, 134.49,[a] 150, and 2400 baud
CS-4-2:	110, 134.49,[a] 150, 600, 1200, 2400, 4800, 9600, and 50000 baud
CS-4-3:	45.5, 50.0, 75.0, 80.0, 82.5, 96.0, 100, 200, and 300 baud
Speeds available for special modules	37.5, 45.5, 50.0, 52.5, 55.7, 56.9, 61.1, 66.7, 67.5, 73.3, 74.2, 75.0, 80.0, 82.0, 82.5, 84.9, 91.0, 93.8, 96.0, 100, 110, 112.5, 120, 133.2, 134.49,[a] 134.5, 135, 140.6, 150, 187.5, 192, 200, 300, 600, 1050, 1200, 2000, 2250, 2400, 3600, 4800, 9600, 18000, 19200, 24000, 28000, 40800, 48000, and 50000 baud.

[a]Marked on panel 134.5.

SECTION II

INSTALLATION

The Test Message Generators TMG-10 are delivered ready for use. However, it is advisable to perform the following preoperational checks before initial use of the instrument and to perform the indicated procedures if applicable.

2-1. Preoperational Checks. The TMG-10 is set at the factory to operate from a 115-volt 60-Hz ac power source. If the instrument is to be used with a 230-volt or 50-Hz power source, follow the procedure of Paragraph 2-3. If the instrument is to be used with a 115-volt ac power source, check that the slide switch located on the rear panel below the fuse is set to expose the number 115.

Check that the rear panel SYNC switch is set on INT (unless the instrument is to be used with an external synchronizing clock source as described in Paragraph 3-5.)

The instrument is shipped from the factory set to generate EIA signals. If MIL-188 signals are desired, follow the procedure of Paragraph 2-4.

Instruments equipped with the option subassembly OS-1 module are shipped from the factory set for 60-milliampere wet neutral or negative-marking polar output. For positive-marking polar output, follow the procedure of Paragraph 2-5. If some other value of loop current is desired, follow the procedure of Paragraph 2-6. Check that the POLAR/WET NEUTRAL switch on the rear panel is set to the desired mode of operation.

Instruments which contain a 7-level exerciser message (as indicated by an MSG switch on the front panel labeled 7 FOX) are shipped from the factory with the block parity character programmed to check longitudinal redundancy only if the 2-character station identification code to be used with the message was furnished to the factory at time of order. All other instruments are programmed for an all-marking block parity character. The procedure for programming the block parity character is given in Paragraph 2-7.

For instruments equipped with a clock source CS-3 module (as indicated by a BAUD switch labeled CAL), it is advisable to check the internal clock calibration using the procedure of Paragraph 2-8 or Paragraph 2-9.

If an output signal shaping capacitor is desired for MIL-188 signals, mounting space is provided on the power supply-mother board PS-MB module. Refer to the schematic and layout diagrams in Section VII for the location of the capacitor mounting space.

2-2. Procedure for Removing TMG-10 from Case. Do not attempt to remove the TMG-10 from its case unless required by an applicable procedure. Many of the preoperational procedures may be performed without removing the instrument from its case.

WARNING

Unless required by a test procedure, do not plug the instrument into the ac power supply while the cover is off.

a. Remove the four screws located on the rear of the instrument which fasten the top and side cover piece to the chassis.

b. Slide the top and side cover piece back and up to remove it from the instrument. For most adjustments and preoperational checks, the removal of the cover is all the disassembly that is required and steps c through f may be omitted.

c. If it is necessary to remove a printed-circuit module (Paragraph 2-7), perform the following operations. Remove the exposed screws from the front panel.

d. Remove the gray front-panel overlay.

e. Remove the two screws located on the front panel at the top and bottom of the printed-circuit module which is to be removed. Refer to the final assembly diagram in Section VII for the locations of the printed-circuit modules.

f. Rock the printed-circuit module out of its connector and lift up and back to get it out of the case. Note that the front-panel switches are part of the printed-circuit module.

g. Replace the complete instrument in its case when preoperational checks are completed.

2-3. Procedure for Use with 230-Volt and/or 50-Hz Power Source. If the instrument is to be powered from a 230-volt ac power source, set the slide switch located on the rear panel below the fuse so as to expose the number 230.

If the ac power source is 50 Hz and if the instrument contains a clock source CS-3 module (as indicated by a BAUD switch labeled CAL), remove the instrument cover (Paragraph 2-2) and set the jumper clip on the CS-3 module to bridge the label "50". Refer to the final assembly and module layout drawings in Section VII for the location of the CS-3 module and the jumper clip.

NOTE

Instruments containing a clock source CS-4 module (as indicated by nine speed numbers on the BAUD switches) do not require this jumper-clip setting.

2-4. Procedure for Setting EIA/MIL Output. To set the EIA/MIL front-panel output, remove the instrument cover (Paragraph 2-2) and position the jumper clip located on the power supply-mother board PS-MB module to bridge the desired signal output type. Instruments are shipped from the factory with the jumper clip set in the EIA– position. Refer to the PS-MB layout diagram in Section VII for the location of the jumper clip. Setting the jumper clip to EIA– produces a negative-marking EIA signal at the EIA/MIL output. Setting the jumper clip to MIL+ produces a 6-volt positive-marking MIL-188 signal at the EIA/MIL output.

NOTE

If the instrument contains an OS-1 module, refer to Paragraph 2-5 before completing this procedure.

2-5. Procedure for Setting OS-1 Signal Output Polarity. This procedure applies only to instruments containing an option subassembly OS-1 module (as indicated by LOOP OUT, LOGIC OUT, and INT CLOCK jacks on the rear panel). The same EIA– /MIL+ jumper clip referenced in Paragraph 2-4, and located on the power supply-mother board PS-MB module, is used to control the wet neutral, wet polar, and logic signal output polarities. The instrument is shipped from the factory with the jumper clip set in the EIA - position. Table 2-1 gives the output signals associated with each jumper-clip setting.

NOTE

It is not possible to control the polarities independently, nor is it desirable to change the jumper-clip setting often. If a conflict in signal output requirements exists, a permanent setting should be chosen which will meet the majority of the test signal requirements.

Table 2-1. Power Supply-Mother Board PS-MB Jumper-Clip Settings.

Setting	Signal Outputs	Output Jack
EIA–	Negative-marking EIA	Front-panel EIA/MIL jack
	Negative-marking wet polar	Rear-panel LOOP OUT jack, if POLAR/WET NEUTRAL switch is in POLAR position
	Normal (open-circuit spacing) wet neutral	Rear-panel LOOP OUT jack, if POLAR/WET NEUTRAL switch is in WET NEUTRAL position
	Positive-marking unipolar logic	Rear-panel LOGIC OUT jack
MIL+	Positive-marking MIL-188	Front-panel EIA/MIL jack
	Positive-marking wet polar	Rear-panel LOOP OUT jack, if POLAR/WET NEUTRAL switch is in POLAR position
	Inverted (open-circuit marking) wet neutral	Rear-panel LOOP OUT jack, if POLAR/WET NEUTRAL switch is in WET NEUTRAL position
	Positive-spacing unipolar logic	Rear-panel LOGIC OUT jack

2-6. Procedure for Setting OS-1 Loop Current Output. This procedure applies only to instruments containing an option subassembly OS-1 module (as indicated by LOOP OUT, LOGIC OUT, and INT CLOCK jacks on the rear panel). Note the current output may be adjusted without removing the instrument case. This output was factory-set at 60 milliamperes, nominal. If some other value of polar or neutral loop current is desired, use the following procedure to adjust the regulated current output.

a. Plug the ac power cord into an appropriate ac outlet and turn the power switch on.

b. Set the rear-panel POLAR/WET NEUTRAL switch to WET NEUTRAL. (This procedure is used to adjust either polar or neutral output current.)

c. Push the front-panel MODE switch labeled MARK.

d. Plug a milliammeter (100-mA full-scale) into the LOOP OUT jack, using a standard telephone plug with tip connected to the negative terminal of the milliammeter.

e. Use a screwdriver to adjust the LOOP ADJUST potentiometer so that the milliammeter reads the desired loop current.

f. Unplug the ac power cord.

g. Set the rear-panel POLAR/WET NEUTRAL switch to the desired signal output.

2-7. Procedure for Programming Block Parity Character. This procedure applies only to instruments containing a 7-level exerciser message (as indicated by a front-panel MSG switch labeled 7 FOX). The block parity character which will produce a valid longitudinal redundancy check at the end of each fox message depends upon the text of the 7-level fox message. The text is fixed except for the two characters programmed on the front panel, which are transmitted as the first two characters (station identification code) of the 7-level message. To program the block parity check character, use the following procedure.

a. Record the bit configurations for the first six bits of the two station-identification code characters in the appropriate space in Table 2-2. Refer to Table 3-4 for the 7-level IBM code chart. Table 2-3 is an example of this procedure, filled out for the station identification letters AC.

b. Determine and record the proper vertical parity bit (7th bit) for each of the two characters. (The TMG-10 automatically inserts the proper parity during the message transmission. Even parity, odd parity, or seventh bit marking or spacing may be selected for transmission by the appropriate switches on the front panel.) In Table 2-2, duplicate only the parity bit that is to be transmitted with the message for characters 1 and 2. Table 2-3 illustrates odd vertical parity.

c. To determine the block parity character, start with bit 1 and record in the proper column (odd or even horizontal parity) a mark or a space, depending on what is required to supplement the three bits already recorded for bits 1 of characters 1, 2, and net. Continue similarly for bits 2 through 7. Note that the block parity bit 7 is determined by the 7th bits of characters 1, 2, and net. Bit 7 of the block parity character is not a vertical parity bit. Table 2-3 illustrates even horizontal (block) parity.

NOTE

Do not program the block parity character as all spaces. HK and IL are illegal station identification codes for odd block parity. IJ is an illegal station identification code for even block parity.

Table 2-2. Block Parity Character Bit Configuration Chart.

Bit No.	Character No. 1 (step a)	Character No. 2 (step a)	Net of Fixed 7-Level Message	Block Parity Character Required (step c)	
				Odd Horizontal Parity	Even Horizontal Parity
1			S		
2			M		
3			M		
4			S		
5			S		
6			S		
7, odd vertical parity (step b)			S		
7, even vertical parity (step b)			S		

Table 2-3. Block Parity Character, Sample Calculations for "AC" Station Identification Code with Odd Vertical Parity and Even Horizontal Parity.

Bit No.	Character No. 1 = A (step a)	Character No. 2 = C (step a)	Net of Fixed 7-Level Message	Block Parity Character Required (step c)	
				Odd Horizontal Parity	Even Horizontal Parity
1	M	M	S		S
2	M	M	M		M
3	S	S	M		M
4	S	S	S		S
5	S	M	S		M
6	M	M	S		S
7, odd vertical parity (step b)	S	M	S		M
7, even vertical parity (step b)			S		

d. Remove the TMG-10 cover (Paragraph 2-2). It is recommended that the character counter CC-2 module be removed from the assembly (Paragraph 2-2). Refer to the final assembly drawing in Section VII for the location of the CC-2 module.

WARNING

Be sure that the TMG-10 is disconnected from the power source before removing modules from the assembly.

e. Set the jumper clips on the CC-2 module to the positions determined in step c. Refer to the CC-2 layout diagram in Section VII for jumper clip locations. Note that bit 1 is the jumper clip on the right end of the row and should be programmed up for mark (1--M) and down for space (1--S).

f. Reinstall the CC-2 module in the assembly.

2-8. CS-3 Oscillator Calibration Using the Data Quality Analyzer DQA-10. This procedure applies only to instruments containing the clock source CS-3 module (as indicated by a front-panel BAUD switch labeled CAL). If the companion Data Quality Analyzer DQA-10 or a similar crystal-controlled speed-error measuring device is available, use the following procedure to check the calibration of the TMG-10 clock oscillator. If no such analyzing instrument is available, use the procedure of Paragraph 2-9.

a. Remove the TMG-10 cover (Paragraph 2-2). Plug the TMG-10 and the DQA-10 into the ac power source and turn both instruments on.

WARNING

High voltages exist in the dc power supply located on the PS-MB module at the bottom of the instrument. Do not attempt to reach components near the PS-MB module.

b. Select (push) the following TMG-10 front-panel switches:

A BAUD switch for the highest speed at which the instrument will normally be used and which is also available on the DQA-10.

1.00 STOP

8 LEVEL

8 FOX MSG

CONT MODE

0 % DSTN

c. Select (push) the following front-panel switches on the DQA-10:

The BAUD switch for the speed selected on the TMG-10

8 LEVEL

SPEED DSTN

(The PEAK DSTN switch should be out)

EIA INPUT (if TMG-10 output is EIA (Paragraph 2-4)

Set the V/MA/DSTN toggle switch to DSTN

d. Patch the TMG-10 EIA/MIL output to the DQA-10 EIA/MIL input

e. Allow both instruments to warm up for 5 minutes.

f. Adjust the CAL potentiometer located on top of the TMG-10 CS-3 module so that the DQA-10 reads zero speed error. (Refer to final assembly and CS-3 layout diagrams in Section VII for module and potentiometer locations.)

g. Unplug the ac power cords and reassemble the TMG-10.

2-9. CS-3 Oscillator Calibration Alternate Procedure. This procedure applies only to instruments containing the clock source CS-3 module (as indicated by a front-panel BAUD switch labeled CAL). If no speed analyzing instrument is available, use the following procedure to check the calibration of the TMG-10 clock oscillator.

NOTE

Calibration of the internal clock source shall be attempted only when the frequency of the ac power source is known to be accurate. At any given time, the clock source stability may exceed the accuracy of commercial ac power system operating frequency.

a. Plug the TMG-10 into the ac power source and turn it on.

b. Select (push) the following front-panel switches

CAL BAUD

REV MSG

0 % DSTN

c. Allow the instrument to warm up for 5 minutes.

d. Observe the POWER indicator lamp. If the internal clock source is operating properly, the POWER indicator lamp will fade on, then off, and then on again in ten or more seconds.

e. If the indicator lamp cycles in less than 10 seconds, remove the instrument cover (Paragraph 2-2).

WARNING

High voltages exist in the dc power supply located on the PS-MB module at the bottom of the instrument. Do not attempt to reach components near the PS-MB module.

f. Check that the 50-60 Hz jumper clip is properly positioned (Paragraph 2-3).

g. Adjust the CAL potentiometer located on the top of the CS-3 module so that the POWER indicator lamp cycle time is greater than 10 seconds.

h. Unplug the ac power cord and reassemble the TMG-10.

SECTION III

OPERATION

3-1. Panel Functions. Table 3-1 lists the front-panel controls and indicators used in the operation of the TMG-10. Table 3-2 lists the rear-panel controls. Table 3-3 lists the input and output jack functions.

Table 3-1. TMG-10 Front-Panel Controls and Indicators.

Control or Indicator	Position	Function
BAUD mechanically interlocked switch bank	CAL (only on units with CS-3 modules)	When pushed, sets TMG-10 for calibration check of clock source CS-3 oscillator
	Numeral	When pushed, sets TMG-10 to operate at indicated speed in baud. Note that any message can be transmitted at any of the available speeds.
	EXT	When pushed, sets TMG-10 to operate from external speed control clock source which must be plugged into CLOCK jack.
STOP mechanically interlocked switch bank	--	When pushed, inserts stop element of indicated bit length at the end of each character of message selected by MSG switch.
LEVEL mechanically interlocked switch bank	--	When pushed, sets TMG-10 to operate at indicated code level. Note that level switch selected must agree with code level of message selected by MSG switch.
CHARACTER ONE independent switch bank	1 through 7 (latching)	When pushed, sets indicated bit of first programmable character for marking. When not pushed, sets indicated bit of first programmable character for spacing.
	REL (momentary)	When pushed, causes single transmission of first programmable character if 2 CH MSG switch and 1 CH MODE switch are selected.
CHARACTER TWO independent switch bank	1 through 7 (latching)	When pushed, sets indicated bit of second programmable character for marking. When not pushed, sets indicated bit of second programmable character for spacing.

Table 3-1. TMG-10 Front-Panel Controls and Indicators. (Cont'd)

Control or Indicator	Position	Function
CHARACTER TWO independent switch bank (cont'd)	REL (momentary)	When pushed, causes single transmission of second programmable character if 2 CH MSG switch and 1 CH MODE switch are selected.
MSG mechanically interlocked switch bank. (There are only two FOX switches on each instrument.)	5 FOX, 6 FOX, or 8 FOX	When pushed, selects message of indicated code level. Message will read: "THE QUICK BROWN FOX....XX (as programmed on the CHARACTER switches). Note that LEVEL switch must be selected to agree with message code level and that mode of transmission is selected by MODE switch.
	7 FOX	When pushed, selects 7-level exerciser message. Message will read: "XX (as programmed on the CHARACTER switches) THE QUICK BROWN FOX..." ending with an end-of-block character, the block parity character (Paragraph 2-7), and a 29-character pause. Note that the 7 LEVEL switch must be selected and that mode of transmission is selected by MODE switch.
	2 CH	When pushed, selects 2-character message programmed on CHARACTER switches. Note that LEVEL switch must be selected to agree with message code and that mode of transmission is selected by MODE switch.
	REV	When pushed, selects reversals which will be transmitted continuously except when MARK or SPACE MODE switch is selected.
PARITY mechanically interlocked switches		The PARITY switch selection has no effect on 5- or 6-level messages.
	ODD	When pushed, sets TMG-10 to insert odd parity bit automatically at the end of each 7- or 8-level character.
	EVEN	When pushed, sets TMG-10 to insert even parity bit automatically at the end of each 7- or 8-level character.
	Both ODD and EVEN	When pushed, sets TMG-10 to transmit marking parity bit automatically at the end of each 7- or 8-level character. When released, sets TMG-10 to transmit spacing parity bit automatically at the end of each 7- or 8-level character. NOTE To override the mechanical interlock, both switches must be pushed simultaneously. To release both switches, push in and then push to release.

Table 3-1. TMG-10 Front-Panel Controls and Indicators. (Cont'd)

Control or Indicator	Position	Function
MODE mechanically interlocked switch bank	CONT	Causes message selected to be transmitted continuously at all outputs.
	MARK	Sets all outputs to mark hold regardless of message selected. Note the SIGS lamp is off for marking.
	SPACE	Sets all outputs to space hold regardless of message selected. Note the SIGS lamp is on for spacing.
	1CH	Sets all outputs to mark hold and allows transmission of single characters. If a FOX MSG switch is selected, the message will be transmitted one character (in sequence from the selected message) each time the STEP MODE switch is pushed. If the 2 CH MSG switch is selected, either one of the two characters programmed on the CHARACTER switches will be transmitted each time the appropriate REL switch is pushed.
MODE independent switch	STEP	Causes transmission of single character if 1 CH MODE and FOX MSG switches are selected. The STEP switch has no effect unless the 1 CH MODE switch is selected. The STEP switch has no effect if the 2 CH MSG switch is selected.
DSTN mechanically interlocked switch bank		Controls type of distortion. Amount of distortion is set on % DSTN switches.
	SW B	Introduces switched bias distortion, marking and spacing bias alternating with each character, in selected message.
	SP B	Introduces spacing bias distortion in every character of selected message.
	MK B	Introduces marking bias distortion in every character of selected message.
% DSTN mechanically interlocked switch bank	--	Introduces distortion of indicated percentage into selected message. Type of distortion is set on DSTN switches.
Red POWER indicator lamp	Unlighted	Internal power supply is off.

Table 3-1. TMG-10 Front-Panel Controls and Indicators. (Cont'd)

Control or Indicator	Position	Function
Red POWER indicator lamp (cont'd)	Lighted, with BAUD numerical or EXT switch selected	Internal power supply is on.
	Fading on and off, with CAL switch selected	Indicates phase shift between ac power source and internal clock source. (Paragraph 2-9)
OFF toggle switch	Up	Connects internal dc power supply to ac power source.
	Down	Disconnects internal dc power supply from ac power source.
White SIGS indicator lamp	Lighted	Indicates that transmission drive to outputs is spacing.
	Unlighted	Indicates that transmission drive to outputs is marking.
	Blinking	Indicates that lamp is following signal containing both mark and space bits.

Table 3-2. TMG-10 Rear-Panel Controls.

Control or Indicator	Position	Function
SYNC slide switch	INT	Sets TMG-10 transmission speed to be controlled by front-panel BAUD switches.
	EXT	Sets TMG-10 to accept transmission speed control from externally generated clock source plugged into SYNC jack.
Voltage input slide switch	115	Sets internal dc power supply to operate from 115-V ac input.
	230	Sets internal dc power supply to operate from 230-V ac input.
LOOP ADJUST potentiometer (only if unit contains option subassembly OS-1 module)	--	Controls wet neutral and polar output current.

Table 3-2. TMG-10 Rear-Panel Controls. (Cont'd)

Control or Indicator	Position	Function
POLAR/WET NEUTRAL (only if unit contains option subassembly OS-1 module)	POLAR	Sets LOOP OUT output for polar signals
	WET NEUTRAL	Sets LOOP OUT output for wet neutral signals

Table 3-3. TMG-10 Jacks.

Jack	Location	Used for
CLOCK BNC connector	Front Panel	Input from external oscillator for external control of signal speed up to 50,000 baud. External oscillator must operate at a frequency in Hz of 20 times the desired signal speed in baud and supply 4 volts sinusoidal (rms) or pulses (positive peak) into 600 ohms. Any internal message may be transmitted with internally controlled distortion.
NEUTRAL 1/4-inch telephone jack	Front Panel	Output test signal for nonpolarized solid-state dry-contact keying of neutral loop. Loop current should not exceed 100 milliamperes. External battery of not more than 260 volts is required in loop.
EIA/MIL BNC connector	Front Panel	Output test signal for driving EIA or MIL-188 circuits. Output signal is negative for marking and positive for spacing (6 volts) if internal jumper clip is set for EIA. Output signal is positive for marking and negative for spacing (6 volts) if internal jumper clip is set for MIL.
SYNC BNC connector	Rear Panel	If SYNC slide switch is in EXT position, input from external oscillator for external control of signal speed up to 1,000,000 baud. External oscillator must operate at a frequency in Hz equal to the desired signal speed in baud and supply 3 volts (nominal) positive pulses into 225 ohms. Any internal message may be transmitted synchronized to the negative-going oscillator transitions.
LOOP OUT 1/4-inch telephone jack (only if unit contains option subassembly OS-1 module)	Rear Panel	Output test signal for driving neutral or polar loops. Signal type is determined by setting of POLAR/WET NEUTRAL switch. Regulated output current, controlled by LOOP ADJUST potentiometer, is adjustable from 10 to 65 milliamperes.
LOGIC OUT BNC connector (only if unit contains option subassembly OS-1 module)	Rear Panel	Logic level output, +4 volts and ground. Marking sense is controlled by internal EIA/MIL jumper clip.

Table 3-3. TMG-10 Jacks. (Cont'd)

Jack	Location	Used for
INT CLOCK BNC connector (only if unit contains option subassembly OS-1 module)	Rear Panel	Output signal from the internal clock for synchronizing external equipment. Signal is ±6-volt pulses at twice signal speed (i.e., a frequency in Hz equal to the signal speed in baud).

3-2. Operating Procedure for Internally Controlled FOX Messages. To use the TMG-10 to provide fox-message signals for testing telegraph or data transmission equipment, use the following procedure.

a. Plug the ac power cord into an appropriate ac outlet and turn the power switch on. Check that the red POWER indicator lamp is lighted.

b. Check that the rear-panel SYNC switch is on INT.

c. Select (push) the BAUD, STOP, LEVEL, and FOX MSG switches to produce the desired signal speed, stop element length, code level, and message.

NOTE

If the desired signal speed is not available on the BAUD switches, use the procedure of Paragraph 3-4 or 3-5 for external speed control.

d. Program the two CHARACTER switch banks for the desired transmission. Refer to Table 3-4 for the various code charts and push the switches which correspond to marking bits. The two characters will be transmitted as the station identification code of the selected FOX message.

NOTE

Do not program either of the two characters to be all spacing bits. An all spacing character is recognized by the TMG-10 as an end of message condition.

NOTE

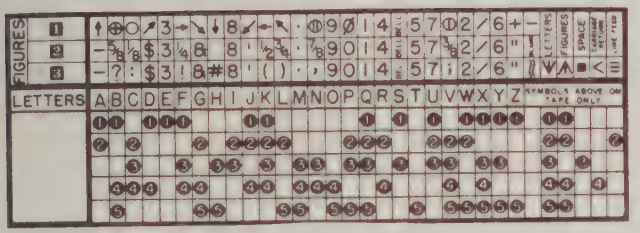
The positions of the switches corresponding to unused bits (i.e., bits 6 and 7 in 5-level code) have no effect on the signal transmission.

e. Select the CONT MODE switch. Select the PARITY, DSTN, and % DSTN switches to produce the desired parity, type of distortion, and amount of distortion.

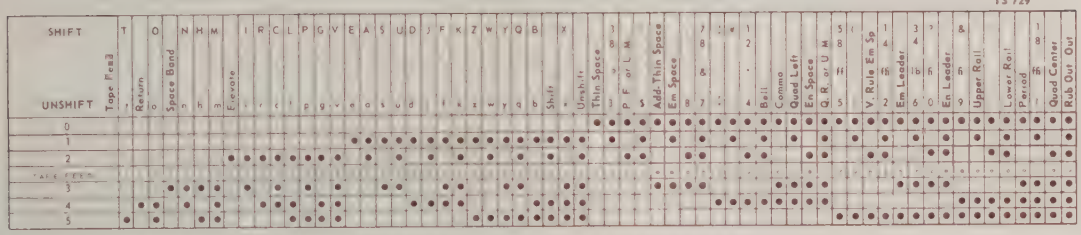
f. If the option subassembly LOOP OUT wet neutral or polar output is to be used, check that the POLAR/WET NEUTRAL switch is in the appropriate position and that regulated current output is set for the desired value (Paragraph 2-6).

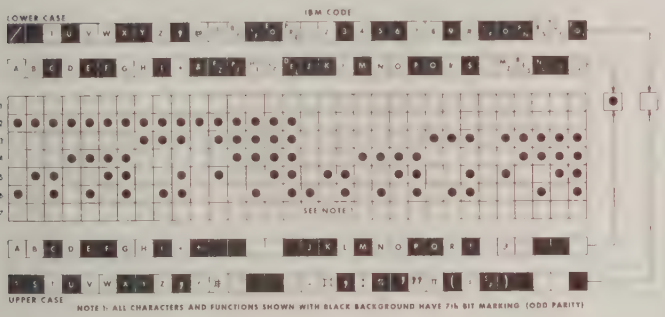
Table 3-4. Teleprinter Code Charts.

FIVE-LEVEL BAUDOT

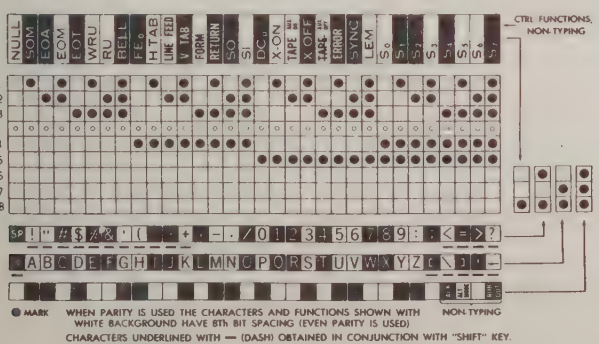


SIX-LEVEL CODE CHART





EIGHT-LEVEL ASCII CODE



g. Connect the circuit(s) under test to the appropriate output(s).

3-3. Operating Procedure for Other Internally Controlled Messages. To use the TMG 10 to provide any of the other internally controlled messages, follow the procedure of Paragraph 3 2, with the following exceptions.

Two-Character Message. To transmit any two characters alternating continuously,

a. Program the two CHARACTER switch banks for the desired transmission (as in step d of Paragraph 3-2).

b. Select (push) the 2 CH MSG switch. Check that the proper BAUD, STOP, LEVEL, PARITY, MODE (CONT), DSTN, and % DSTN switches are selected.

Mark-Hold or Space-Hold. To stop the continuous message transmission and set the outputs to mark or space, push the MARK MODE or the SPACE MODE switch. The previously selected message will be resumed only when the CONT MODE switch is selected.

Single Character Transmission. To transmit a message, one character at a time.

a. Select the 1 CH MODE switch. Check that the proper BAUD, STOP, LEVEL, CHARACTER, MSG, PARITY, DSTN, and % DSTN switches are selected.

b. If a FOX MSG switch is selected, push the STEP MODE switch each time a character transmission is desired. If the 2 CH MSG switch is selected, push the REL switch located below the programmed character to be transmitted.

Reversals. To transmit reversals, select the REV MSG switch. Check that the proper BAUD, MODE (CONT), DSTN and % DSTN switches are selected.

3-4. Operating Procedure for External Clock Speed Control with Distortion Control. If the desired signal speed is not available on the BAUD switches, a clock source may be provided by a standard laboratory signal generator. The output of the signal generator may be sinusoidal (3 to 15 volts rms) or positive peak pulses (4 to 20 volts).

NOTE

This procedure can be used only for signal speeds up to 50,000 baud. For higher signal speeds refer to Paragraph 3-5.

a. Select the EXT BAUD switch.

b. Patch the signal generator into the front-panel CLOCK jack.

c. Adjust the signal generator for a frequency (in Hz) 20 times the desired signal speed (in baud).

d. Otherwise follow the procedure of Paragraph 3-2.

3-5. Operating Procedure for External Synchronizing Speed Control of Undistorted Messages. For signal speeds up to 1,000,000 baud, speed control may be provided by an external synchronizing oscillator. The output of the external oscillator must be 3-volt (nominal) positive pulses. Instrument output signal will be synchronized with the negative-going oscillator transitions.

a. Set the rear-panel INT/EXT switch to EXT. This overrides any selection made on the BAUD switch bank.

b. Patch the signal generator into the rear-panel SYNC jack.

c. Adjust the signal generator for a frequency (in Hz) equal to the desired signal speed (in baud).

d. Select the desired LEVEL, CHARACTER, MSG, and PARITY switches. In the STOP switch bank, select either 1.00 or 2.00. Push the CONT MSG and 0 % DSTN switches.

e. Connect the circuit(s) under test to the appropriate output(s).

f. If desired during a test, the MARK or SPACE MODE switch or the REV MSG switch may be selected. Do not select the 1 CH MODE switch.

3-6. Longitudinal Redundancy Check.

NOTE

This procedure applies only to the 7 FOX exerciser message.

The block parity character for longitudinal redundancy check is programmed in the TMG-10 based upon two specific station identification code characters (Paragraph 2-7). To force the block parity character invalid, and check that the receiving machine detects the invalid longitudinal redundancy, reverse the setting of any single CHARACTER bit switch.

3-7. Operating Procedure for "Exercising" IBM 1050-Class Equipment.

NOTE

This procedure applies only to the 7 FOX exerciser message.

To use the TMG-10 to exercise IBM 1050 equipment, use the following procedure.

a. Plug the ac power cord into an appropriate ac outlet and turn the power switch on. Check that the red power indicator lamp is lighted.

b. Check that the rear-panel sync switch is on INT.

c. Select (push) the following front-panel switches:

134.5 BAUD

1.00 STOP

7 LEVEL

Bits 3, 4, 5, and 6 of CHARACTER ONE switch bank (Bits 1 and 2 should be out). This programs EOT into CHARACTER ONE.

2 CH MSG

ODD PARITY

1 CH MODE

DSTN and % DSTN as required

d. Connect the circuit under test to the appropriate output.

e. Push the REL CHARACTER ONE switch.

f. Reset the two CHARACTER switch banks. Refer to Table 3-4 for code chart.

Set CHARACTER ONE for the "address all stations" code.

Set CHARACTER TWO for the digit representing equipment to be exercised. (1 = printer 1; 2 = printer 2; 3 = punch 1; 4 = punch 2; 5 = keyboard; 6 = reader 1; 7 = reader 2; 9 = all output units; 0 = all input units)

NOTE

Equipment having automatic timeout or disconnect features may drop off the line unless steps g through l are performed in rapid succession.

g. Push the REL CHARACTER ONE switch.

h. Push the REL CHARACTER TWO switch.

i. Reset the CHARACTER ONE switch bank for EOA (bits 3, 5, and 6 in for mark; bits 1, 2, and 4 out for space).

j. Push the REL CHARACTER ONE switch.

k. Reset the two CHARACTER switch banks for the station identification code letters.

l. Select the 7 FOX MSG and the CONT MODE switches. The instrument is now transmitting a continuous 7-level test message.

m. To stop the test and shut off the 1050 equipment, select the 1 CH MODE and 2 CH MSG switches. Reset the CHARACTER ONE switch bank for EOT (bits 3, 4, 5, and 6 in for mark; bits 1 and 2 out for space). Push the REL CHARACTER ONE switch.

SECTION IV

THEORY OF OPERATION

The Test Message Generator TMG-10 is a self-contained instrument whose internal dc power supply requires only standard (115- or 230-volt) ac input. Digital solid-state logic is used throughout. Because it is recommended that the instrument be returned to the factory for repair or maintenance, the following discussion of the instrument operation will be limited to continuous transmission of a fox message with internal speed control.

Figure 4-1 is a simplified block diagram of the TMG-10. Complete schematic and layout diagrams of the TMG-10 modules are included in Section VII.

The clock source module (CS-3 or CS-4) generates a highly accurate timing signal at a frequency (in Hz) of 20 times the signal speed (in baud) at which the TMG-10 is operating. The clock signal is fed to the distortion marks generator module (DM-2). The DM-2 generates distortion reference marks occurring in 5-percent increments of the baud period. The appropriate pair of reference marks, as selected by the % DSTN switch bank, is fed to the distortion gating module (DG-2). The DM-2 also generates a double-speed signal (i.e., frequency in Hz is equal to signal speed in baud). This UP signal and an inverted DOWN signal are used for reference timing throughout the instrument.

The UP signal is used to step the bit counter (on the bit counter module BC-1). The bit counter output is used to shift the scanner through the parallel data lines (bit lines) from the fixed message module (FM-2). This converts the parallel data to a serial bit stream. Loading of the characters (parallel data) into the converter is controlled by the character counter module (CC-2). Advance of the character count is controlled by the system reset pulse generated by the BC-1 module at the beginning of each character.

The undistorted serial bit stream from the BC-1 is fed (through the MSG switch bank) to the DG-2 module where the selected distortion is introduced into the signal (as controlled by the distortion reference marks from the DM-2).

The output of the DG-2 module is fed to the power supply-mother board module (PS-MB) where it is processed and delivered to the front-panel output jacks. For units containing an option subassembly (OS-1), the mother board module supplies a logic level distorted signal to the OS-1 module which contains the current regulator for wet neutral and polar signals and the output driver for logic signals.

Not shown on the block diagram, the parity bit generator (for 7- and 8-level signals) is located on the DG-2 module. Both even and odd parity is generated for each character and fed to the PARITY switches on the FM-2 module. The selected parity bit is fed to the BC-1 module for insertion in the undistorted message.

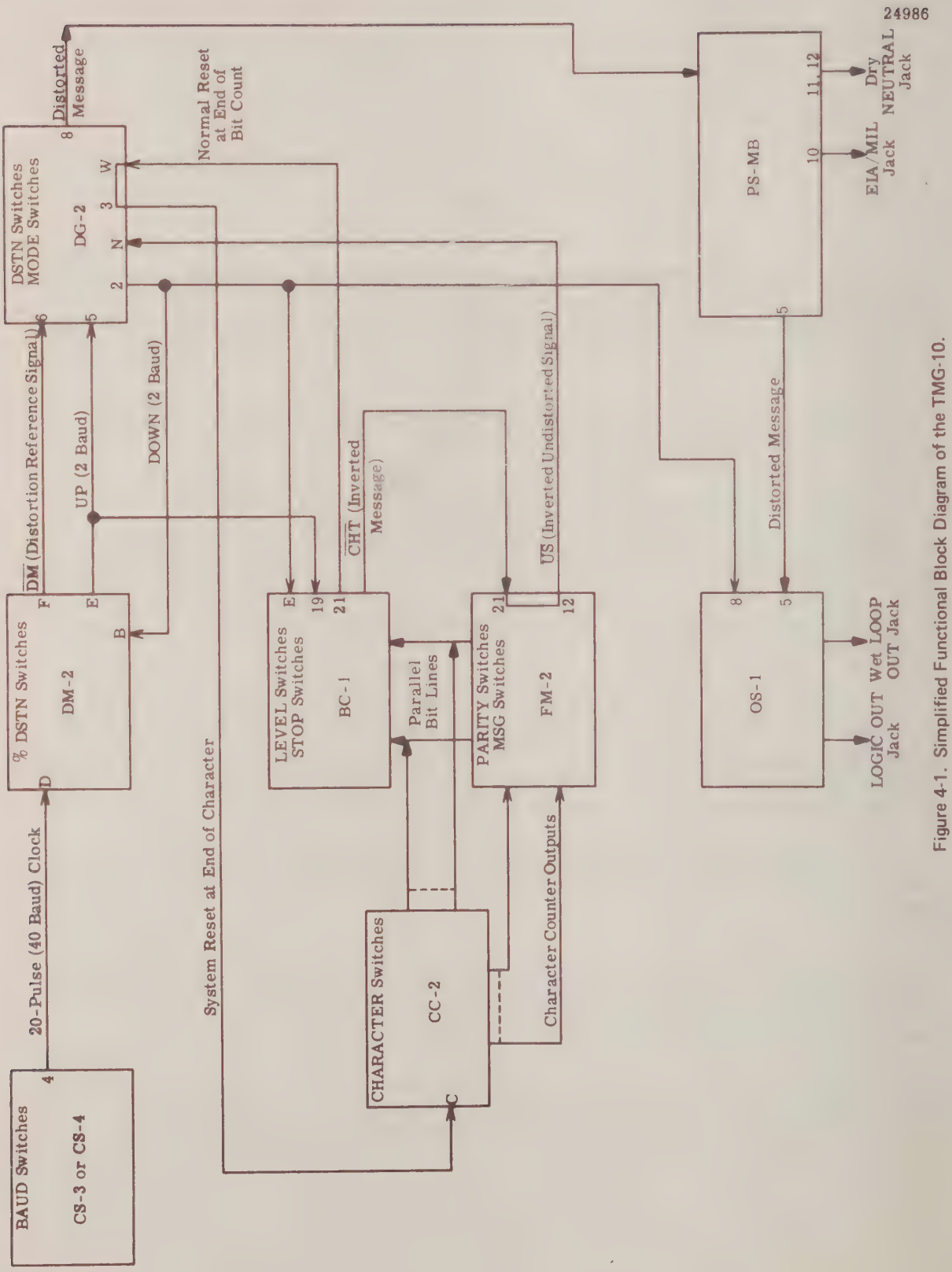


Figure 4-1. Simplified Functional Block Diagram of the TMG-10.

SECTION V

MAINTENANCE

5-1. Maintenance. No routine maintenance is required for the TMG-10 except for periodic check of the clock source CS-3 calibration (Paragraph 2-8 or 2-9). Units containing clock source CS-4 modules do not need this calibration.

Procedure for checking loop current output on units containing the option subassembly OS-1 module is given in Paragraph 2-6.

5-2. Fuse and Lamp Replacement. The fuse is located on the rear panel. For 115-volt operation use 1/2-ampere slow-blow replacement fuse; for 230-volt operation use 1/4-ampere slow blow replacement fuse. The two indicator lamps are located on the front panel. Replacement lamps should be General Electric No. 387, or equivalent.

5-3. CS-4 Speed Substitution and Crystal Replacement. Instruments equipped with the crystal-controlled clock source CS-4 module are shipped from the factory ready for operation at any of the speeds indicated on the front panel switches.

To substitute a crystal to provide a new transmission speed capability, first determine the crystal required for the desired speed. For guaranteed operation and speed accuracy, order the crystal from Atlantic Research Corporation.

Crystal Selection. If the desired speed is one of the standard speeds listed in Table 5-1, read the crystal frequency required and strap required from the chart. If the desired speed is not one of the standard speeds, calculate the required crystal frequency, using the following procedure.

a. From Table 5-2, read the "multiplier" which applies to the speed range within which the desired speed lies. (Where two speed ranges overlap, there will be two acceptable crystal frequencies with different installation strapping requirements.)

b. Multiply the desired speed (in baud) by the "multiplier" from step a to obtain crystal frequency in Hz.

Table 5-1. CS-4 Crystal Frequencies and Strapping for Standard Signal Speeds.

Speed (baud)	Crystal Frequency Required (Hz)	Strap(s) Required
37.5	240,000	64
44.5	284,950	64
45.5483 (45.5)	291,509	64
50.0	320,000	64
52.5	336,000	64
55.7	356,480	64
56.8546 (56.9)	363,869	64
61.1	391,040	64
66.7	426,666	64
67.5	432,000	64
73.3	469,120	64
74.268 (74.2)	475,052	64
75.0	480,000	64
80.0	256,000	32
82.0	262,400	32
82.5	264,000	32
84.9	271,680	32
91.0	291,200	32
93.8	300,160	32
96.0	307,200	32
100.0	320,000	32
110.0	352,000	32
112.5	360,000	32
120.0	384,000	32
133.2	426,240	32

Table 5-1. CS-4 Crystal Frequencies and Strapping for Standard Signal Speeds. (Cont'd)

Speed (baud)	Crystal Frequency Required (Hz)	Strap(s) Required
134.49	430,368	32
134.5	430,400	32
135.0	432,000	32
140.6	449,920	32
150.0	480,000	32
187.5	300,000	16
192.0	307,200	16
200.0	320,000	16
300.0	480,000	16
600.0	480,000	8
1,050.0	420,000	4
1,200.0	480,000	4
2,000.0	800,000	4
2,250.0	900,000	4
2,400.0	960,000	4
3,600.0	720,000	2
4,800.0	960,000	2
9,600.0	960,000	1
18,000.0	360,000	1 and J[a]
19,200.0	384,000	1 and J[a]
24,000.0	480,000	1 and J[a]
28,000.0	560,000	1 and J[a]
40,800.0	816,000	1 and J[a]
48,000.0	960,000	1 and J[a]
50,000.0	1,000,000	1 and J[a]

[a]See step e of Installation Instructions

Table 5-2. Crystal Selection Chart.

Speed Range (baud)	Multiply Speed by	Use Strap(s)
30-78	6,400	64
60-156	3,200	32
120-312	1,600	16
240-625	800	8
480-2,500	400	4
960-5,000	200	2
1,920-10,000	100	1
10,000-50,000	20	1 and J[a]

[a]See step e of Installation Instructions.

c. Note the strap requirement, for use during the installation procedure.

For example: The crystal selected for a transmission speed of 2,000 baud should be either 800,000 Hz (2,000 X 400) with strap 4 required, 400,000 Hz (2,000 X 200) with strap 2 required, or 200,000 (2,000 X 100) with strap 1 required.

Crystal Installation. Install the new crystal in the TMG-10, using the following procedure.

a. Consult the CS-4 schematic and layout diagrams (in Section VII of this manual) and decide which BAUD switch is to be used for the new speed.

b. Remove the TMG-10 from its case (Paragraph 2-2, steps a and b). If strap changes are required remove the CS-4 module from the instrument (Paragraph 2-2, steps c through f).

c. Install the new crystal in the proper position. Note crystal position 1 corresponds to the top BAUD switch and strapping terminal A.

d. Check the strapping between the lettered terminal corresponding to the switch position and the numbered terminal. If the strapping is not that which was determined in step c of the crystal selection procedure, remove the existing strap and install the proper new wire strap. Record the new strapping on the CS-4 schematic diagram in Section VII. Check that none of the existing wire straps are disconnected by the new installation. Reconnect disconnected straps if necessary.

e. If the new signal speed is above 10,000 baud, also install an insulated wire strap between terminal J (located just above the switch bank) and pin 2 of the proper BAUD switch.

f. Remount the CS-4 module and return the TMG-10 to its case.

g. Record the new speed in the proper switch position on the TMG-10 front panel.

5-4. Repair. Only factory repair is recommended for the TMG-10.

SECTION VI

PARTS LISTS

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO
SHEET OF SHEETS

APPROVED		DATE
CHECKED		
PREPARED		

SUBJECT TMG-10
TEST MESSAGE GENERATOR

SEE ADDENDUMS FOR P. C. ASSEMBLIES

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

LTR	REVISION DESCRIPTION	DATE	APPD	LTR	REVISION DESCRIPTION	DATE	APPD
A	Revised Per DCN 799						

RECORD OF REVISION STATUS OF EACH SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
						A		A	A		A																															

DWG NO. PART NO. OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP FA 41834676							REF	Final Assembly TMG-10		
TP SA 41832676		1					REF	Chassis Assembly TMG-10		
								Option Subassembly OS-1		
TP DA 41829676			1					Chassis		
33699				2			2	Stud, Self Clinching, #FH5 632 5 Penn Engr & Mfg Co		
#MS				6			6	Nut Extension #46N 062 EXR 2 #6 32 THD. Precision Metal Products		
#MS				4			4	Nut, Extension, #44N 062 EXR 6 #4 40 THD Precision Metal Products		
34451			1				#2	Connector, P.C., 15 Positions Duo-Tyne, #582377-9, AMP, Inc	J1	
33350 33352				5			#41	Contact, Flag, Duo Tyne #22 #66149 4, AMP, Inc		
TP-21784676							1	Cord Hanger		
33077			1				1	Fuse Holder, #HKP, Bussman Mfg Div	#F1?	
#3AG				1			1	Fuse, 1 2 Amp, Slo-Blo, 3 AG, Littlefuse Inc	F1	
33606							1	Switch, Slide, SPDT, G-124, Continental Wirt	S1?	
				2			2	Screw, Mach, PH, SS, #2-56NC-2 x 1 4 Lg.		
				2			2	Nut, Hex, Mach, SS, #2		
				2			2	Lockwasher, Split, SS, #2		
33398			1				#3	Connector, BNC, Insulated, #KC 79-67, Kings Electronics	J102	
33206			1				1	Transformer, Power, Per ARC Dwg TP-21775676, Florida Transformer Co	T101	

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING

PARTS LIST

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TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 676
SHEET 3 OF ____ SHEETS

APPROVED		DATE
PROJ ENGR	[illegible]	12-19-69
CHECKED	[illegible]	6-27-69
PREPARED	[illegible]	8-8-69

SUBJECT
TMG 10
TEST MESSAGE GENERATOR

SEE ADDENDUMS FOR P C ASSEMBLIES

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
33892			1				1	Cord, Power, Per AR [illegible] PhALO Plastics [illegible]		
33583			1				1	Switch, Slide, DPDT, 115 230 #46256LF Switchcraft, Inc		
2278			1				1	Lug, Terminal, Solder Locking #1416 4 M H Smith Inc		
10755			1				1	Nameplate, TP-31001000, ARC		
			2				#6	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1 4 Lg		
			4				4	Nut, Mach, Hex [illegible]		
			3				3	Washer, Lock, Int Tooth, SS, #4		
TP-SA-41803676		1	1				REF	Front Panel Assembly, TMG [illegible]		
TP-41803676			1					Front Panel		
TP-DA-21778676			1				1	Bezel		
				8			8	Fastener, Self Clinching, [illegible] Penn Eng & Mfg, Inc		
33343			1				1	Connector, P C, 12 Positions, Duo Tyne, #5823769, AMP, Inc	J201	
33356, 33352				11			11	Contact, Plug, Duo Tyne, #22, #66149 4, AMP, Inc		
33619			1				1	Nut, Decorative Mtg, 1 4 40, #N 1A, Alco Elect Prods Inc		
33398			2				2	Connector, BNC, Insulated, #KC 79-67, Kings Electronics	J203, J204	
33624			1				1	Switch, Toggle, SPDT, #MST 115D, A L C Elect Prods Inc	S201	
33048			1				1	Lamp Holder, Red Lens, #911 1112 1631 525, DIALCO	DS201	
33022			1				1	Lamp Holder, Clear Lens, #911 1112 1637 525, DIALCO	DS202	
33023			2				2	Lamp, Incandescent, Flanged Base, 28V, 04 Amps, #387 Long Life, G E		
33172			1				1	Jack, Phone, Hi D, 2 Conductor, #N 112A, Switchcraft, Inc	J20.	
33764				1			1	Nut, Knurled, 3 8 32, Black Anodized Alum, #5807 000 0012 04, DIALCO		
			5				5	Screw, Mach, Flat Hd, SS, #6 32NC 2 x 3 8 Lg		
33744			1				1	Cable Clamp, 3 16 I D, #832 M H Smith		
			1				1	Washer, Flat, SS, #6		
			1				#9	Washer, Split Lock, SS, #6		
			1				1	Nut, Mach, Hex, SS, #6		
(SEE NOTE 2, SHT 4)		1					1	Clock Source, CS-3		

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO 676
SHEET 1 OF SHEETS

APPROVED		DATE
PROJ ENGR		11-14-69
CHECKED		6 27 69
PREPARED	WKH	6 18 69

SUBJECT: TMG 10
TEST MESSAGE GENERATOR

SEE ADDENDUMS FOR P C ASSEMBLIES

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO, PART NO, OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
										63
TP AD 31377676		1					REF	Switch Harness Assembly		64
										64A
33480				1				Switch, Pushbutton 8 Stn Per ARC Dwg TP 31376676 2	S1V S2R	65
33399					1		1	Spacer, Hex, SS #4 40 x 9 16 Lg #8107 SS-0440 7 Amatom Elect Hdwr Co		66
				2				Screw Mach, Pan Hd, SS, #4 40NC 2 x 1 4 Lg		67
										68
34451			1					Connector, P C 15 Positions Duo Tyne, #582377 9, AMP, Inc	J6	69
33350 33352				15				Contact, Flag, Duo Tyne, #22, #66149 4, AMP, Inc		70
										71
										72
										73
33487		1						Front Panel Overlay, Per ARC Dwg TP 41802676 Duralith Corp		74
33697		4					4	Screw, Panel, Phil Hd, #6 32 x 1 2 SS, #26373 Gray Finish, SFSW-6C 8 CPS08GY, Stake Fastener Co		75
33717		4					4	Cap Nut, Acorn, Hex, N P Brass, #6 32NC 2		76
33484		1					1	Labels, Switch, Per ARC Dwg TP 31378676 1, Duralith Corp		77
33485							1	Labels, Switch, Per ARC Dwg TP 31378676 2 Duralith Corp		78
34475		1					1	Cabinet, Optima, Per ARC Dwg TP 41830676 Scientific Atlanta		79
										80
										81
		14					14	Screw, Mach, Flat Hd, SS, #4 40NC 2 x 1 4 Lg		82
		4					4	Screw, Mach, Flat Hd, SS, #6-32NC 2 x 3 16 Lg		83
		6					6	Screw, Mach, Pan Hd, SS, #6 32NC-2 x 3 16 Lg		84
		8					8	Washer, Lock, Split, SS, #6		85
										86
										87
										88
										89
								BULK MATERIAL		
										90
		AR					As Req'd	Cable, Shielded, #8451, Belden		91
		AR					As Req'd	Wire, #22 AWG, Stranded, Tinned, Copper, 600V Thermoplastic Insulation, Color As Req'd		92
		AR					As Req'd	Ties, Cable		93
		AR					As Req'd	Solder, #44 Core, 3S 61 5T 35 5L, Kester		94
										95
										96
										97
										98

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PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA VIRGINIA

PARTS LIST NO 676
SHEET 4 OF SHEETS

APPROVED		DATE
PROJ ENGR		11/14/69
CHECKED		6-27-69
PREPARED	WKH	6 18 69

SUBJECT
TMG 10
TEST MESSAGE GENERATOR

SEE ADDENDUMS FOR P ASSEMB

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO PART NO OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
								CUSTOMER OPTION		
NOTE 5								The Option Subassembly OS 1 ARC DL 687 is To Be Installed Only When Specified On Customer Order		
NOTE 6								The [illegible] A4 [illegible] Must Be Replaced By [illegible] A4 [illegible] When Specified On Customer Order		

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 476 SHEET 1 OF 1 SHEETS

APPROVED		DATE
PRO. ENGR	[illegible]	11 14 69
CHECKED	[illegible]	11 14 69
PREPARED	[illegible]	6-18 69

SUBJECT TMG-10 — ADDENDUM #1 — POWER SUPPLY MOTHER BOARD — PS MB

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP SD 41826676	--						PFI	Schematic Diagram		1
										2
										3
TP AD 41826676	1						REF	P C Board Assembly		4
TP DA 41827676		1					1	Printed Circuit Board Plated Thru Holes		5
TP PC2 80423676			1				1	Printed Circuit Artwork		6
										7
33414			3				3	Terminal Pin Solder 1132 7 Cambridge Thermionic Corp	E1 Thru E3	8
33415								[illegible]		9
										10
34424		6						Connector P C #252 22 30 160 [illegible] Mfg Co	J1 Thru J6	11
										12
										13
										4
32139							1	Capacitor Fixed Electrolytic 1000 mfd -10%, +50% 16 WVDC, C437AR E1000, Amperex Elect Corp	C1	15
32137								Capacitor Fixed Electrolytic 250 mfd -10% +50% [illegible] WVDC, C437AR G250, Amperex Elec Corp	C2	16
32133							1	Capacitor, Fixed, Electrolytic 64 mfd -10% +50% 16 WVDC, C437AR E640, Amperex Elect Corp	C3	17
32383		1					1	Capacitor, Fixed, Ceramic Disc .001 mfd ±10% 500 WVDC, Sty b 506B, MIAL, Inc	C4	18
32483		1					1	Capacitor, Fixed, Flat Foil .022 mfd, ±10% 250 WVDC, C280AE P22K, Amperex Elect Corp	C5	19
										20
										21
										22
32635		2					2	Diode, Zener, 6 8V @ 20 ma , #1N5235, Motorola Semiconductor	CR1, CR4	23
32514 32504		1					1	Diode, Silicon, 1N461 or ARC Spec 1 1 2, Fairchild Semiconductor	CR3	24
32520		1					1	Diode, Germanium, #1N277 or ARC Spec 1 2 1 Sylvania Elect Co	CR2	25
32525		2					2	Diode, Silicon, Planar, #1N914 or ARC Spec 1 1-6, Sylvania Elect Co	CR5, CR6	26
32617		1					1	Diode, Silicon, Zener 3W, 300 V, ±10%, #UZ230, Unitrode Corp	CR7	27
32523		4					4	Diode, Silicon, #1N4003 Motorola Semiconductor	CR8 Thru CR11	28
										29
										30
										31
32580		3					3	Rectifier, Bridge, Fullwave, Single Phase, 50V @ 2 Amps, #PD05, Electronic Devices Inc	M1 Thru M3	32
										33
								[illegible]		34
								[illegible]		35
										36
										37
										38

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PARTS LIST

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TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. [illegible]
SHEET 5 OF [illegible] SHEETS

	APPROVED	DATE
PRG. ENGR.	[illegible]	[illegible]
CHECKED	[illegible]	6 [illegible] 69
PREPARED	[illegible]	[illegible] 69

SUBJECT: TMG 10 — ADDENDUM #1 — POWER SUPPLY MOTHER BOARD — PS MA

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES STYLES TRADE NAMES AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
										39
32670		4					4	Transistor [illegible] Fairchild Semiconductor	[illegible]	40
32673								Transistor [illegible] Motorola Semiconductor	[illegible]	41
32674								Transistor [illegible] Motorola Semiconductor	[illegible]	42
[illegible]								Transistor [illegible] Motorola Semiconductor	[illegible]	43
[illegible]								Transistor [illegible] Motorola Semiconductor	[illegible]	44
32664		2					2	Transistor Silicon #2N3638 Fairchild Semiconductor	[illegible]	45
32705		4					4	Transistor Silicon #2N3646, Fairchild Semiconductor	Q8,Q11,Q13,Q14	46
										47
30222		[illegible]					[illegible]	Resistor Fixed Comp 180 Ohms ±10% 1 4 W Type GB [illegible] IRC	[illegible]	48
30218		[illegible]					[illegible]	Resistor Fixed Comp [illegible] Ohms ±10% 1 4 W Type GB IRC	[illegible]	49
30072		2					2	Resistor Fixed Comp 1K ±10% 1 4 W Type GBT IRC	R[illegible]	50
30073		1					1	Resistor Fixed Comp 1 5K ±10% 1 4 W Type GBT IRC	[illegible]	51
30195		2					2	Resistor Fixed Comp 1 8K ±10% 1 4 W Type GBT IRC	R8,R25	52
30074		7					7	Resistor Fixed Comp 2 2K ±10% 1 4 W Type GBT IRC	R13 R18 R23 R27 R29 R32 R34	53
30077		5					5	Resistor Fixed [illegible] Type GBT IRC	[illegible]	54
30069		2					2	Resistor Fixed Comp 6 8K ±10% 1 4 W Type GBT IRC	R17, R17	55
30078		5					5	Resistor Fixed Comp 10K ±10% 1 4 W Type GBT IRC	[illegible]	56
30128								Resistor Fixed [illegible] Type GBT IRC	[illegible]	57
30794								Resistor Fixed [illegible] Type GBT IRC	[illegible]	58
30755							1	Resistor Fixed Comp [illegible] Type GBT IRC	R	59
30853		1					1	Resistor Fixed Comp [illegible] Type GBT IRC	R6	60
30961								Resistor [illegible] Ohms ±10% [illegible] W	R[illegible]	61
30975		1					1	Resistor Fixed Wire [illegible] Type BWH IRC	R[illegible]	62
30941		1					1	Resistor Fixed WW 720 Ohms ±5% 2 W Type BWH IRC	R36	63
30894							1	Resistor Fixed WW [illegible] Ohms ±10% 5 W Type PW 5A IRC	R	64
										65
33104		1					1	Transformer #PE 6447 Pulse Engineering, Inc	T	66
34468		1					1	Dissipator, Heat #UP T03-B, Int'l Elec Research Corp	XQ2	67
										68
										69
										70
		6					6	Screw, Pan Hd, SS, #4-40NC-2 x 1 2 Lg		71
		9					9	Washer, Lock, Split, SS, #4		72
		9					9	Nut Hex SS #4-40NC 2		73
		2					2	Screw, Pan Hd SS 4-40NC 2 x 5 16 Lg		74
		1					1	Screw, Pan Hd SS #4-40NC 2 x 1 4 Lg		75
										76

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PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 676 — SHEET 1 OF ____ SHEETS

APPROVED		DATE
PROJ ENGR	[illegible]	12-14-69
CHECKED	[illegible]	12-16-69
PREPARED	[illegible]	12-18-69

SUBJECT: TMG-10 — ADDENDUM #2 — BIT COUNTER — BC 1

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP-SD-41808676	--						REF	Schematic Diagram		1
										4
										5
TP AD 41810676	1						REF	P C Board Assembly		4
TP 41809676								Printed [illegible] Boards Plated Thru Holes		5
TP PC2 80418676			1				1	P C Board Artwork		6
										7
										8
										9
32421							1	Capacitor, Fixed, Ceramic Disc 270 pF ±10% 500 WVDC, Style 506B, MIAL, Inc	C4	10
32446								Capacitor, Fixed, Ceramic Disc [illegible] pF ±20% 500 WVDC, Style 506B, MIAL Inc	C1	11
32184								Capacitor Fixed, Flat Foil [illegible] mfd ±20% 250 WVDC, #C280AE P100K, Amperex Elect Corp	C2	2
32232								Capacitor, Fixed, Electrolytic 50 mfd + 50% -10% 6.4 WVDC, #C426AR C50, Amperex Elect Corp	C3	3
										14
										15
30074							1	Resistor, Fixed, Comp, 2.2K ±10%, 1/4 W, Type GBT, IRC	R2	16
30076		2					2	Resistor, Fixed, Comp, 3.3K ±10%, 1/4 W, Type GBT, IRC	R1, R3	17
										18
										19
33481		1					1	Switch, Pushbutton, 9 Stn, Per ARC Dwg TP 31376676 3	S1	20
33399			7				2	Spacer, Hex, SS, #4-40 x 9/16, #8107-SS-0440-7, Amatom Elect Hdwr Co		21
			2				2	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1/4 Lg		22
			4				2	Screw, Mach, Pan Hd, SS, #4-36NC-2 x 3/16 Lg		23
			2				2	Washer, Lock, Internal Tooth, SS, #4		24
33173		1					1	Test Point, Horizontal, Brown, #105-758, E F Johnson Co	TP1	25
33166		1					1	Test Point, Horizontal, Red, #105-752, E F Johnson Co	TP2	26
33174		1					1	Test Point, Horizontal, Orange #105-756, E F Johnson Co	TP3	27
										28
										29
32865		1					1	Integrated Circuit, #MC770P, Motorola Semiconductor	Z1	30
32887		1					1	Integrated Circuit, #MC786P, Motorola Semiconductor	Z2	31
32883		1					1	Integrated Circuit, #MC724P, Motorola Semiconductor	Z3	32
32869		1					1	Integrated Circuit, #MC717P, Motorola Semiconductor	Z4	33
32885		2					2	Integrated Circuit, #MC790P, Motorola Semiconductor	Z5, Z6	34
32897		1					1	Integrated Circuit, #MC9721P, Motorola Semiconductor	Z7	35
34420		1					1	Integrated Circuit, #MC789P, Motorola Semiconductor	Z9	36
32898		1					1	Integrated Circuit, #MC9719P, Motorola Semiconductor	Z8	37
										38

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PARTS LIST

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TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 676
SHEET 2 OF SHEETS

APPROVED		DATE
		11 14 69
CHECKED		6 18 69
PREPARED		6 18 69

SUBJECT TMT-[illegible] ADDENDUM #3 CHARACTER COUNTER

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO, PART NO OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP SU 418 [illegible]			1				[illegible]	[illegible]		
TP AD 418 [illegible]							[illegible]	[illegible] Board Assembly		4
TP [illegible] 418 [illegible]							1	Printed Circuit Board Plated Thru Holes		
TP PC 418 [illegible]							1	[illegible] Board Artwork		
[illegible]								Terminal Pin Solder #1332 2		
23074			[illegible]				[illegible]	[illegible]	[illegible]	2
284								[illegible]		
33173		1						Test Point Horizontal Brown #105 *58 E F Johnson Co		
32184							1	[illegible] Fixed [illegible] Amperex [illegible]		
32132								6 4 WVDC #C426AR C50 Amperex [illegible]		1
32430								[illegible] Fixed Ceramic Disc [illegible] pF [illegible] 500 WVDC Style 506B MIAL Inc		
32442								[illegible] Fixed Ceramic Disc 33 pF ±10% [illegible] WVDC Style 506B MIAL Inc	4	
										1
30076		4					4	Resistor Fixed Comp 3 3K ±10% 1 4 W Type GBT IRC	R1 Thru R4	18
										20
33480		1					1	Switch Pushbutton 8 Station Per ARC Dwg TP 313766/6 2	S1	21
33399			2	1			2	Spacer Hex [illegible] 4 40 x .4 Lg #8107 SS 0440 7, Ametom Elect Hdwr Co		22
			2				2	Screw, Mach, Pan Hd, SS, #4 40NC 2 x 1 4 Lg		23
			2				2	Screw, Mach, Pan Hd, SS, #3 56NC 2 x 3 16 Lg		24
			[illegible]				[illegible]	Washer Lock Internal Tooth SS #4		25
										26
32869		[illegible]					[illegible]	Integrated Circuit #MC717P Motorola Semiconductor	Z1 Z2	27
32898								Integrated Circuit #MC9719P Motorola Semiconductor	Z3	28
34419		1					1	Integrated Circuit #MC787P Motorola Semiconductor	Z4	29
32885		[illegible]					[illegible]	Integrated Circuit #MC790P Motorola Semiconductor	Z5 Thru Z7	30
32283		1					[illegible]	Integrated Circuit #MC724P Motorola Semiconductor	Z8	31
32887		1					1	Integrated Circuit #MC786P Motorola Semiconductor	Z9	32
32897		1					1	Integrated Circuit #MC9721P Motorola Semiconductor	Z10	33
										34
										35
										36
										37
										38

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PARTS LIST

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TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 676
SHEET 2 OF ____ SHEETS

APPROVED		DATE
PROJ ENGR	[illegible]	11-14-69
CHECKED	[illegible]	6 17 69
PREPARED	[illegible]	6 18 69

SUBJECT: TMG-10 ADDENDUM #4 FIXED MESSAGE FM-2

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP SD 41813676	--						REF	Schematic Diagram		1
										2
										3
TP AD 41813676	1						REF	P C Board Assembly		4
TP DA 41812676								Printed Circuit Board, Plated Thru Holes		5
TP PC2 80421676			1					Printed Circuit Artwork		6
										7
										8
32184		1					1	Capacitor, Fixed, Flat Foil, 1 mfd, 250 WVDC ±20%, #80AE P100K, Amperex Electronic Corp	C1	9
32192								Capacitor, Fixed, [illegible] mfd, [illegible] WVDC, [illegible] ±20%, #40AA [illegible], Amperex Electronic Corp	C2	10
										11
										12
32670		1					3	Transistor, Silicon, #[illegible], Fairchild Semiconductor Prod	Q1 Q2 Q3	13
										14
30077		3					3	Resistor, Fixed, Comp, [illegible]K, ±10%, 1/4 W, Type GBT, IRC	R1, R6, R7	15
										16
30077		3					3	Resistor, Fixed, Comp, 4.7K, ±10%, 1/4 W, Type GBT, IRC	R2, R4, R5	17
30078		1						Resistor, Fixed, Comp, 10K, ±10%, 1/4 W, Type GBT, IRC	R3	18
										19
										20
32898		1					1	Integrated Circuit, #MC9719P Motorola Semiconductor	Z1	21
32897		1					1	Integrated Circuit #MC9721P Motorola Semiconductor	Z2	22
33454		10					10	Socket, Integrated Circuit, #M 1161, Methode Mfg Corp	XZ3 Thru XZ12	23
										24
										25
33483		1					1	Switch, Pushbutton, 8 Stn, Per ARC Dwg TP-31376676-5	S1	26
			2				2	Screw, Mach, Pan Hd, SS, #3-56NC-2 X 3/16 Lg		27
33399			2				2	Spacer, Hex, SS, #4-40 X 9/16 Lg, #8107 SS-0440-7, Amatom Elect Hdwr Co		28
			2				2	Screw, Mach, Pan Hd, SS, #4-40NC-2 X 1/4 Lg		29
			2				2	Washer, Lock, Internal Tooth, SS, #4		30
										31
33173		1					1	Test Point, Horizontal, Brown, #105-758, E F Johnson	TP1	32
33166		1					1	Test Point, Horizontal, Red, #105-752, E F Johnson	TP2	33
										34
										35
										36
										37
										38

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TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO 676
SHEET 2 OF SHEETS

APPROVED	DATE
PRC ENGR	11-14-67
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PREPARED	

SUBJECT TMG-10 ADDENDUM #4 FIXED MESSAGE FMG

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG NO PART NO OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
										39
										40
										41
										42
										43
										44
										45
										46
										47
										48
										49
										50
										51
										52
										53
										54
								— — — NOTE — — — — —		
								PURCHASE ONLY THOSE [illegible] REQD ACCORDING TO CUSTOMER ORDER		55
										56
— —		— —					— —	Integrated Circuit XC170 Case, Motorola Semiconductor Products	Z1 Thru Z13	57
										58
								FIVE (5) LEVEL FOX CONSISTS OF THE FOLLOWING		59
34435		1					1	Integrated Circuit, #SCM129, SLF1, Motorola Semiconductor Prods	Z3	60
34436		1					1	Integrated Circuit, #SCM130, SLF2, Motorola Semiconductor Prods	Z4	61
34437		1					1	Integrated Circuit, #SCM131, SLF3, Motorola Semiconductor Prods	Z5	62
34438		1					1	Integrated Circuit, #SCM132, SLF4, Motorola Semiconductor Prods	Z6	63
34439		1					1	Integrated Circuit, #SCM132, SLF5, Motorola Semiconductor Prods	Z7	64
										65
								EIGHT (8) LEVEL FOX CONSISTS OF THE FOLLOWING		66
34430		1					1	Integrated Circuit, #SCM124, 8LF1, Motorola Semiconductor Prods	Z8	67
34431		1					1	Integrated Circuit, #SCM125, 8LF2, Motorola Semiconductor Prods	Z9	68
34432		1					1	Integrated Circuit, #SCM126 8LF3, Motorola Semiconductor Prods	Z10	69
34433		1					1	Integrated Circuit, #SCM127, 8LF4, Motorola Semiconductor Prods	Z11	70
34434		1					1	Integrated Circuit, #SCM128, 8LF5, Motorola Semiconductor Prods	Z12	71
										72
										73
										74
										75

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 676 — SHEET 1 OF ____ SHEETS

APPROVED		DATE
PROJ. ENGR	[illegible]	1-19-69
CHECKED	[illegible]	6-27-69
PREPARED	[illegible]	6-19-69

SUBJECT: TMG-10 — ADDENDUM #5 DISTORTION GATING DG-2

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP-SD 41814676	--						REF	Schematic Diagram		1
										2
										3
TP AD 41816676	1						REF	P C Board Assembly		4
TP 41815676		1					1	Printed Circuit Board Plated Thru Holes		5
TP PC2 80420676			1				1	Printed Circuit Artwork		6
										7
										8
										9
32383		1						Capacitor, Fixed, Ceramic Disc, 1000 pF, 500 WVDC, ±10%, Style 506B, MIAL, Inc	C6	10
32184								Capacitor, Fixed, Flat Foil, 1 mfd, 250 WVDC, ±20%, #C280AE P100K, Amperex Electronic Corp	C7	11
32261		3					3	Capacitor, Fixed, Ceramic Disc, 330 pF, 500 WVDC, ±10%, Style 506B, MIAL, Inc	C3, C4, C5	12
32132								Capacitor, Fixed, Electrolytic, 50 mfd, 6.4 WVDC, -10%, +50%, #C426AR C50, Amperex Electronic Corp	C1	13
										14
30073		3						Resistor, Fixed, Comp, 1.5K, ±10%, 1/4 W, Type GBT, IRC	R3	15
30025		2						Resistor, Fixed, Comp, 680 Ohms, ±10%, 1/4 W, Type GBT, IRC	R6, R7	16
30076		5					5	Resistor, Fixed, Comp, 3.3K, ±10%, 1/4 W, Type GBT, IRC	R1, R2, R4, R5, R8	17
										18
										19
33482		1						Switch, Pushbutton, 8 Stn., Per ARC Dwg TP 31376676 A	S1	20
			2				2	Screw, Mach, Pan Hd, SS, #3-56NC-2 X 3/16 Lg		21
33399			2				2	Spacer, Hex, SS, #4-40NC-2, #8107 SS 0440 7, Amatom Electronic Hardware Co		22
			2				2	Screw, Mach, Pan Hd, SS, #4-40NC-2 X 1/4 Lg		23
			2				2	Washer, Lock, Internal Tooth, SS, #4		24
33173		1					1	Test Point, Horizontal, Brown, #105-758, E F Johnson Co	TP	25
33166		1					1	Test Point, Horizontal, Red, #105-752, E F Johnson Co	TP2	26
33174		1					1	Test Point, Horizontal, Orange, #105-756, E F Johnson Co	TP3	27
										28
										29
										30
32869		2					2	Integrated Circuit, #MC717P, Motorola Semiconductor	Z2, Z3	31
34419		1					1	Integrated Circuit, #MC787P, Motorola Semiconductor	Z1	32
32870		1					1	Integrated Circuit, #MC718P, Motorola Semiconductor	Z4	33
32885		2					2	Integrated Circuit, #MC790P, Motorola Semiconductor	Z5, Z6	34
										35
										36
										37
										38

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 676
SHEET 2 OF SHEETS

APPROVED		DATE
PROJ. ENGR.	[illegible]	[illegible]
CHECKED	[illegible]	6-2-69
PREPARED	[illegible]	6-2-69

SUBJECT TMG 10 — ADDENDUM #6 — DISTORTION MARKS GEN — DM 7

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO PART NO OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP SD 4182366							REF	[illegible]		
										1
TP AD 4 8456							REF	P[illegible] Board Assembly		4
TP 4[illegible]4646								Printed Circuit Board Plated Thru Holes		
TP PC2 804196							1	P[illegible] Board Assembly		5
										6
										7
32455							[illegible]	[illegible]	[illegible]	9
32[illegible]32								[illegible]		
32484								[illegible]		
										10
										11
33419								Switch Pushbutton 10 Stn Per ARC Dwg TP 31376676 1		12
33399							[illegible]	[illegible] 4-40 X 9/16 Lg #8107-55-0440-7 Amatom Elect Hdwr Co		13
							[illegible]	[illegible] 4-40N [illegible]		14
							[illegible]	[illegible]		15
							[illegible]	Washer [illegible]		16
										17
33173								Test Point Horizontal Brown [illegible] E F Johnson Co	TP[illegible]	20
33166								Test Point Horizontal Red 105-752 E F Johnson Co	TP[illegible]	21
33174							[illegible]	Test Point Horizontal Orange 105-756 E F Johnson Co	TP[illegible]	22
										23
										24
32896								Integrated Circuit #MC725P Motorola Semiconductor	Z1	25
32873		1						Integrated Circuit #MC719P Motorola Semiconductor	Z2	69
32882		1						Integrated Circuit #MC724P Motorola Semiconductor	Z3	27
34419		1						Integrated Circuit #MC787P Motorola Semiconductor	Z4	28
32868								Integrated Circuit #MC771P Motorola Semiconductor	Z5	29
32885		2					2	Integrated Circuit #MC790P Motorola Semiconductor	Z6 Z7	30
										31
										32
										33
										34
										35
										36
										37
										38

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 686
SHEET 1 OF 2 SHEETS

APPROVED	DATE
PROJ. ENGR	11-14-69
CHECKED	6 24 69
PREPARED	3/25/69

SUBJECT: CLOCK SOURCE CS-3

(USED IN TMG 10)

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

LTR	REVISION DESCRIPTION	DATE	APPD	LTR	REVISION DESCRIPTION	DATE	APPD

RECORD OF REVISION STATUS OF EACH SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP-SD-41805686	—						REF	Schematic Diagram		
TP-AD-41807686	1						REF	P C Board Assembly		4
TP-41806686		1					1	Printed Circuit Board		5
TP-PC2-80416686			1				1	P C Board Artwork		6
33414			3				3	Terminal Pin Solder #1132-2 Cambridge Thermionic Corp	E1 Thru E3	7
33415		1					1	Jumper Clip #3610346 Molco Mfg Co., Inc		8
32184		1					1	Capacitor, Fixed, Flat Foil, 1 mfd, ±20%, 250 WVDC, #C280AE P100K, Amperex Elect Corp	C1	9
32132		1					1	Capacitor, Fixed, Electrolytic, 50 mfd, +50%, −10%, 6.4 WVDC, #C426AR C50, Amperex Elect Corp	C2	10
32137		1					1	Capacitor, Fixed, Electrolytic, 250 mfd, +50%, −10%, 40 WVDC, #C437AR G250, Amperex Elect Corp	C3	11
32383		1					1	Capacitor Fixed Ceramic Disc .001 mfd ±10%, 500 WVDC, Style 506B, MIAL Inc	C4	12
										13
32504, 32514		1					1	Diode Silicon #1N661 Or ARC Spec 1 1 2 Fairchild Semiconductor	CR1	14
										15
32670		1					1	Transistor, Silicon #2N3567, Fairchild Semiconductor	Q1	16
										17
33479		1					1	Switch, Pushbutton, 10 Stn, Per ARC Dwg TP-31377676-1	S1	18
33399			2				2	Spacer, Hex SS, 4-40 X 9/16 Lg, #8107-SS-0440-7, Amatom Elect Hdwr Co		19
			2				2	Screw, Mach, Pan Hd, SS, #4-40NC-2 X 1/4 Lg		20
			2				2	Screw, Mach, Pan Hd, SS, #3-56NC-2 X 3/16 Lg		21
			2				2	Washer, Lock, Internal Tooth, SS, #4		22
PL-499-3		1					1	Module, Oscillator, #499-3, Atlantic Research Corp	Y1	23

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO 686
SHEET ___ OF ___ SHEETS

	APPROVED	DATE
PROJ ENGR		11 14 69
CHECKED		3/6/69
PREPARED		3/6/69

SUBJECT

CLOCK SOURCE
CS 3

USED IN TMG 101

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES STYLES TRADE NAMES AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

DWG NO PART NO OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
										24
30025		1						Resistor Fixed Comp 680 Ohms 1 4 W ±10% Type GBT IRC	R2	25
30072		1					1	Resistor Fixed Comp 1 4 W ±10% Type GBT IRC	R4	26
30075		1					1	Resistor Fixed Comp, 2 7K, 1 4 w, ±10% Type GBT IRC	R6	27
30078		1					1	Resistor Fixed Comp, 10K 1 4 w, ±10% Type GBT IRC	R3	28
30024		1					1	Resistor Fixed Comp 1K 1 4 W ±10% Type GBT IRC	R5	29
32787							1	Resistor Variable Cermet 2K ±10% 1/2W PC Mounting	R	30
30954		1					1	Resistor Fixed WW 150 Ohms ±1% 2W Type BWH IRC	R9	31
										32
30210		1					2	Resistor Fixed WW 2 49K Ohms 1 W ± 1% Style SM 4 Riedon Avionics Inc	R1	33
30017		1					1	Resistor Fixed WW 9 31K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R8	34
30211		1					1	Resistor Fixed WW 4 09K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R7	35
30210		1					as	Resistor Fixed WW 2 49K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R10	36
30209			1					Resistor Fixed WW 22 103K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R11	37
30208		1						Resistor Fixed WW 18 82K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R54	38
30206		1						Resistor Fixed WW 1A 856K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R55	39
30204		1						Resistor Fixed WW 76 8 Ohms ± 1% Style SM 4 Riedon Avionics Inc	R56	40
30213		1					1	Resistor Fixed WW 5 49K Ohms ± 1% Style SM 4 Riedon Avionics Inc	R57	41
30202		1					1	Resistor Fixed WW 8 158K Ohms ± 1% Style SM 4, Riedon Avionics Inc	R58	42
										43
32883		1					1	Integrated Circuit, #MC724P Motorola Semiconductor Prods	Z1	44
										45
33173		1					1	Test Point, Horizontal Brown, #105 758, E F Johnson Co	TP1	46
33166		1					1	Test Point, Horizontal, Red, #105 752, E F Johnson Co	TP2	47
										48
										49
										50
										51
										52
										53
										54
										55
DO NOT ISSUE								FOR INFORMATION PURPOSES ONLY		56
33484		1					1	Labels, Switch, Per ARC Dwg TP-31378676-1 Duralith Corp		57
										58
										59
										60
										61

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 688
SHEET 1 OF 5 SHEETS

APPROVED		DATE
PROJ. ENGR.	[illegible]	2 16 70
CHECKED	[illegible]	2-16-70
PREPARED	E V	1-30-70

SUBJECT: CLOCK SOURCE
CS-4
SERIES A

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

LTR.	REVISION DESCRIPTION	DATE	APPD.	LTR.	REVISION DESCRIPTION	DATE	APPD.

RECORD OF REVISION STATUS OF EACH SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-SD-41898688	---						---	Schematic Diagram		1
										2
										3
TP-AD-41899688	1						1	Printed Circuit Board Assembly		4
TP-DA-41900688		1					1	Printed Circuit Board (Plated Thru Holes)		5
TP-PC2-80428688			1				1	Printed Circuit Board Artwork		6
33414		3					3	Terminal, Pin, Solder	E1 Thru E3	7
33415		1					1	Jumper Clip		8
33405		17					17	Terminal, Turret, Sub-Miniature	E4 Thru E20	9
33220		18					18	Lead Socket	H1 Thru H18	10
										11
										12
										13
32447		1					1	Capacitor, Fixed, Ceramic Disc, 120 pF, 500 WVDC, ±10%	C1	14
32235		1					1	Capacitor, Fixed, Electrolytic, 320 Mfd, 6.4 WVDC, −10%, +50%	C2	15
										16
32525		1					1	Diode, Silicon, ARC Spec 1-1-6 or #1N914	CR1	17
										18
										19
32883		2					2	Integrated Circuit, #MC724P	Z6, Z7	20
34419		1					1	Integrated Circuit, #MC787P	Z5	21
32885		4					4	Integrated Circuit, #MC790P	Z1 Thru Z4	22
										23

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-009-7-69

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 588
SHEET 2 OF _____ SHEETS

APPROVED		DATE
	[illegible]	2 16 70
CHECKED	SWI	2 16 70
PREPARED	[illegible]	1 30 70

SUBJECT: CLOCK SOURCE
CS-4
SERIES A

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
										24
30072		3					3	Resistor, Fixed, Comp, 1K, 1/4 w, ±10%	R6, R7, R9	25
30074		2					2	Resistor, Fixed, Comp, 2.2K, 1/4 w, ±10%	R3, R5	26
30075		2					2	Resistor, Fixed, Comp, 2.7K, 1/4 w, ±10%	R1, R10	27
30077		2					2	Resistor, Fixed, Comp, 4.7K, 1/4 w, ±10%	R2, R4	28
33024		1					1	Resistor, Fixed, Comp, 33K, 1/4 w, ±10%	R8	29
30954		1					1	Resistor, Fixed, WW 750 Ohms, 2 w, ±5%	R11	30
										31
										32
33173		1					1	Test Point, Horizontal, Brown	TP1	33
33166		1					1	Test Point, Horizontal, Red	TP2	34
33174		1					1	Test Point, Horizontal, Orange	TP3	35
										36
32705		2					2	Transistor, Silicon, #2N3646	Q1, Q2	37
32664		1					1	Transistor, Silicon, #2N3638	Q3	38
										39
33479		1					1	Switch, Pushbutton, Per ARC Drawing TP-31376676-1	S1	40
33399		2					2	Spacer, Hex, #4-40 Thd X 9/16 Lg.		41
		2					2	Screw, Pan Head, Mach, SS, #4-40NC-2 X 1/4 Lg.		42
		2					2	Screw, Pan Head, Mach, SS, #3-56NC-3 X 3/16 Lg.		43
										44
										45
										46
										47
										48
								BULK MATERIALS		
							As Req'd	Solder, Alloy, 35.61.5T 35.5L; #44 Kester Solder		49
							As Req'd	Wire, Copper, Solid, Tinned, No. 22 AWG, Nominal O.D. .025, #298, Alpha Wire Corp		50
										51
										52
										53
										54
								NOTE: SEE ADDENDUM SHEET FOR CRYSTAL VALUES.		
										55
										56
										57
										58
										59

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

YP-010-7-65

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 688
SHEET 3 OF ____ SHEETS

APPROVED		DATE
PROJ. ENGR.	AC	2-16-70
CHECKED	SWJ	2-16-70
PREPARED	E V	1-30-70

SUBJECT:
CLOCK SOURCE
CS-4-1
SERIES A

ADDENDUM #1

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
33867		1					1	Crystal, Quartz, 291.509 HZ, ±.005%, Type HC6/U	Y1	1
33868		1					1	Crystal, Quartz, 320.000 HZ, ±.005%; Type HC6/U	Y2	2
33869		1					1	Crystal, Quartz, 363.869 HZ, ±.005%; Type HC6/U	Y3	3
33870		1					1	Crystal, Quartz, 426.666 HZ, ±.005%; Type HC6/U	Y4	4
33871		1					1	Crystal, Quartz, 475.052 HZ, ±.005%; Type HC6/U	Y5	5
33873		1					1	Crystal, Quartz, 352.000 HZ, ±.005%; Type HC6/U	Y6	6
33877		1					1	Crystal, Quartz, 430.368 HZ, ±.005%; Type HC6/U	Y7	7
33872		1					1	Crystal, Quartz, 480.000 HZ, ±.005%; Type HC6/U	Y8	8
33882		1					1	Crystal, Quartz, 960.000 HZ, ±.005%, Type HC6/U	Y9	9
										10
										11
										12
										13
								NOTE: AS CRYSTALS ARE EXTREMELY SHOCK SENSITIVE THEY SHOULD NOT BE ISSUED UNTIL UNIT IS DELIVERED FOR FINAL CHECKOUT.		

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-0 10-7-68

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 688
SHEET 1 OF ____ SHEETS

APPROVED		DATE
PROJ. ENGR	[illegible]	2-16-70
CHECKED	[illegible]	2-16-70
PREPARED	E V	1-30-70

SUBJECT: CLOCK SOURCE
CS-4-2
SERIES A
ADDENDUM #2

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
33873		1					1	Crystal, Quartz, 352 000 HZ, ± 005%, Type HC6 U	Y1	1
33877		1					1	Crystal, Quartz, 430 368 HZ, ± 005%, Type HC6 U	Y2	2
33872		2					2	Crystal, Quartz, 480 000 HZ, ± 005%, Type HC6 U	Y3,Y7	3
		3					3	Crystal, Quartz, 240 000 HZ ± 005%, Type HC6 U	Y4,Y5,Y6	4
33882		1					1	Crystal, Quartz, 960 000 HZ, ± 005%, Type HC6 U	Y8	5
		1					1	Crystal, Quartz, 1 000 000 HZ ± 005%, Type HC6 U	Y9	6
										7
										8
										9
										10
								NOTE AS CRYSTALS ARE EXTREMELY SHOCK SENSITIVE THEY SHOULD NOT BE ISSUED UNTIL UNIT IS DELIVERED FOR FINAL CHECK OUT		

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-010-7-65

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 688
SHEET 5 OF ____ SHEETS

APPROVED		DATE
PROJ. ENGR.	[illegible]	2-16-70
CHECKED	[illegible]	2-16-70
PREPARED	E.V	1-30-70

SUBJECT: CLOCK SOURCE
CS-4-3
SERIES A

ADDENDUM #3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
33867		1					1	Crystal, Quartz, 391.509 HZ, ±.005%, Type HC6/U	Y1	1
33868		3					3	Crystal, Quartz, 320.100 HZ, ±.005%, Type HC6/U	Y2, Y7, Y8	2
33872		2					2	Crystal, Quartz, 480.000 HZ, ±.005%, Type HC6/U	Y3, Y9	3
		1					1	Crystal, Quartz, 256.000 HZ, ±.005%, Type HC6/U	Y4	4
		1					1	Crystal, Quartz, 263.00 HZ, ±.005%, Type HC6/U	Y5	5
		1					1	Crystal, Quartz, 307.200 HZ, ±.005%, Type HC6/U	Y6	6
										7
										8
										9
										10
								NOTE AS CRYSTALS ARE EXTREMELY SHOCK SENSITIVE, THEY SHOULD NOT BE ISSUED UNTIL UNIT IS DELIVERED FOR FINAL CHECKOUT		

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-010.7-65

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO 68[illegible]
SHEET [illegible] OF [illegible] SHEETS

APPROVED		DATE
PRO. ENGR	[illegible]	[illegible] 69
CHECKED	[illegible]	3/27/69
PREPARED	[illegible]	3/25/69

SUBJECT:

OPTION SUBASSEMBLY
OS 1

USED IN TMG-101

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

LTR.	REVISION DESCRIPTION	DATE	APPD	LTR.	REVISION DESCRIPTION	DATE	APPD
A	DELETED ITEMS 32 & 45 ADDED ITEM 26 QTY ITEM 24 WAS 2 QTY ITEM 31 WAS 2 ITEM 41 WAS RV4NAYSD502A DCN #799	1/7/70	[illegible]				

RECORD OF REVISION STATUS OF EACH SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
A	A																																								

DWG NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
TP SD 41822687							REF	Schematic Diagram		1
										2
										3
										4
TP AD 41822687							1	P C Board Assembly		5
TP 41821687		1					1	Printed Circuit Board		6
TP PC2 80422687			1				1	P C Board Artwork		7
										8
										9
32149		2					2	Capacitor Fixed Electrolytic 45 Mfd 100 WVDC 10% +100% -BSR24 143 00P1 Cannon	C C	10
										11
										12
32521		12					12	Diode, Silicon, #1N4002, Motorola Semiconductor Prod	CR1 CR8 CR10 CR13	13
32525		2					2	Diode, Silicon, ARC Spec 1-1-6, Or #1N914, Sylvania Electric Products, Inc	CR9, CR15	14
32514 32504		1					1	Diode, Silicon, ARC Spec 1-1-2, Or #1N461, Fairchild Semiconductor	CR14	15
										16
										17
32732		2					2	Transistor Silicon #MJE 340 Motorola Semiconductor Prod	Q2, Q,	18
32733		1					1	Transistor, Silicon #2N4888 Fairchild Semiconductor	Q1	19
32666		1					1	Transistor Silicon #2N3638 Fairchild Semiconductor (Per ARC Dwg TP 21756640)	Q4	20
32713		2					2	Transistor, Silicon, #2N5279, Industro Transistor Corp	Q5, Q6	21
32735		1					1	Transistor, Silicon, #MJ3010, Motorola Semiconductor Prod	Q7	22
										23

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO 687
SHEET 1 OF 3 SHEETS

APPROVED		DATE
PROJ ENGR	[illegible]	11-14-69
CHECKED	[illegible]	12-16-69
PREPARED	[illegible]	12/5/69

SUBJECT: OPTION SUBASSEMBLY OS-1

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES

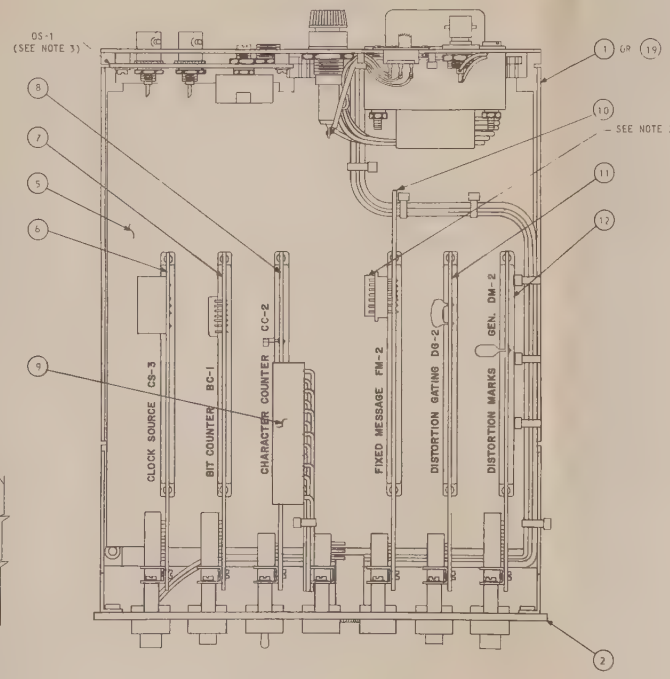
DWG NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF DESIG	ITEM NO
32670		1					1	Transistor, Silicon #2N3567 Fairchild Semiconductor	Q6	1
32664		2					2	Fairchild Semiconductor	Q4 Q5	2
32705		1					1	Transistor, Silicon #2N3646 Fairchild Semiconductor	Q10	10
										11
30782		1					1	Resistor Fixed Comp 100 Ohms 1 2W ±10%, Type GBT IRC	R7	18
30025		1					1	Resistor, Fixed, Comp, 680 Ohms 1 4W, ±10% Type GBT IRC	R17	19
30072		3					3	Resistor Fixed, Comp, 1K 1 4 w, ±10% Type GBT IRC	R9 R11 R14	16
30074		4					4	Resistor Fixed, Comp 2 2K 1 4 w ±10% Type GBT IRC	R4 R7 R6 R16	13
30069		1					1	Resistor Fixed, Comp, 6 8K 1 4 W, ±10%, Type GBT IRC	R18	22
30078		2					2	Resistor, Fixed, Comp 10K, 1 4 w, ±10% Type GBT IRC	R8 R9	15
30085		1					1	Resistor, Fixed, Comp 100K 1 4 w ±10% Type GBT IRC	R12	14
30082		1					1	Resistor Fixed, Comp 22K 1 4 w ±10% Type GBT IRC	R5	17
										36
30889		1					1	Resistor, Fixed, Comp 22K 2 w ±10% Type RC 42, IRC	R	3
30964		1					1	Resistor Fixed WW, 68 Ohms 2w, ±10%, Type BWH, IRC	R	38
30713								Resistor Fixed WW 100 Ohms 2 w ±10% Type BWH IRC	R	39
										40
32786		1					1	Resistor Variable Carbon 5K 2w ±10% RV4NAYSB502A Clarostat Mfg Co	R13	41
										42
32468		1					1	Dissipator, Heat, #UP T03 B, International Elec Res Corp	#Q	43
										44
										45
										46
33327		2					2	Connector, BNC, #UG 1094 U, Amphenol Conn Div	J2, J3	47
33139		1					1	Jack, Phone, #N 111, Switchcraft, Inc	J1	48
33626		1					1	Switch, Toggle, DPDT, #MST-215N, Alco Elec Prod Inc	S1	49
										50
Supplied For Installation Of OS-1 Into TMG-10		2					2	Screw, Pan Hd, SS, #4-40NC 2 X 1 2 Lg		51
Supplied For Installation Of OS-1 Into TMG-10		2					2	Screw, Pan Hd, SS, #4 40NC 2 X 1 4 Lg		52
		2					2	Screw, Pan Head, SS, #4 40NC 2 x 7 16 Lg		53
		6					6	Washer, Lock, Internal Tooth SS 4		54
		2					2	Nut Hex SS #4		55
										56
										57
										58
										59
										60
										61

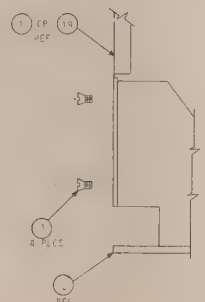
#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

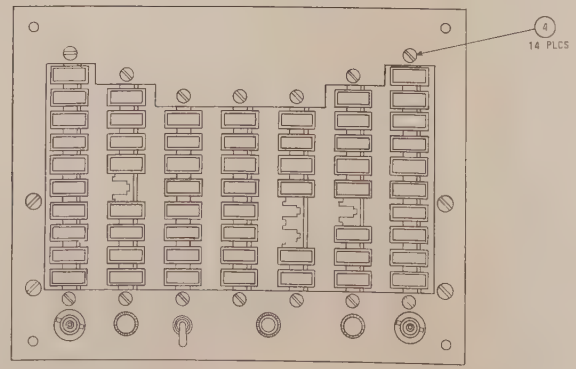
SECTION VII

DRAWINGS

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	EXT/INT SWITCH WAS TOGGLE TYPE DCN #799	4-5-70	RFS	[illegible]	AD







Note
1. [illegible] CS-3 SHOWN TYPICAL
[illegible] MESSAGE IC MODULES ARE OPTIONS
[illegible] APPLIED TO [illegible] TIMER AREA
[illegible] APPLIED ONLY WITH TP-FA-41834676-2.

QTY REQD		PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER
1	1	33485	21	LABELS, SWITCH, TP-31378676-2		DURALITH
1	1	33484	20	LABELS, SWITCH, TP-31378676-1		DURALITH
1	—	TP-SA-41832676-2	19	CHASSIS ASSEMBLY		ARC
1	1	34475	18	CABINET, OPTIMA, TP-41830676		SCIENTIFIC ATLANTA
4	4	33697	17	SCREW, DECORATIVE, #6-32NC-2 X 1 1/2 LG, SS, PH. HD.		STAKE FASTENER CO.
1	1	33487	16	FRONT PANEL OVERLAY, TP-41802676		DURALITH
2	2	33717	15	NUT, CAP, HEX, ACORN, N/P BRASS, #6-32NC-2		
6	6		14	WASHER, LOCK, #6, SS, SPLIT		
4	4		13	SCREW, PAN HD, #6-32NC-2 X 3/16 LG., SS		
1	1	TP-AD-41825676	12	P.C. BOARD ASSEMBLY, DM-2		ARC
1	1	TP-AD-41816676	11	P.C. BOARD ASSEMBLY, DG-2		ARC
1	1	TP-AD-41813676	10	P.C. BOARD ASSEMBLY, FM-2		ARC
1	1	TP-AD-41827676	9	SWITCH, HARNESS ASSEMBLY		AR
1	1	TP-AD-41810676	8	P.C. BOARD ASSEMBLY, CC-2		ARC
1	1	TP-AD-41809676	7	P.C. BOARD ASSEMBLY, BC-1		ARC
1	1	TP-AD-41808676	6	P.C. BOARD ASSEMBLY, CS-3 SEE NOTE 1,		ARC
1	1	TP-AD-41828676	5	P.C. BOARD ASSEMBLY, PS-MB		ARC
14	14		4	SCREW, FLAT HD, #4 40NC-2 X 1/4 LG., SS		
4	4		3	SCREW, FLAT HD, #6-32NC-2 X 3/16 LG., SS		
1	1	TP-SA-41833676	2	FRONT PANEL ASSEMBLY		ARC
—	1	TP-SA-41832676-1	1	CHASSIS ASSEMBLY		ARC
-2	-1					

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL

	BY	DATE
APPROVA.		
DRAWN	E. Duncan	5/19/67
CHECKED	[illegible]	1/20/1
ENGRG	[illegible]	1/1/67
PROJ ENGRG	[illegible]	11-14-67
STRESS		

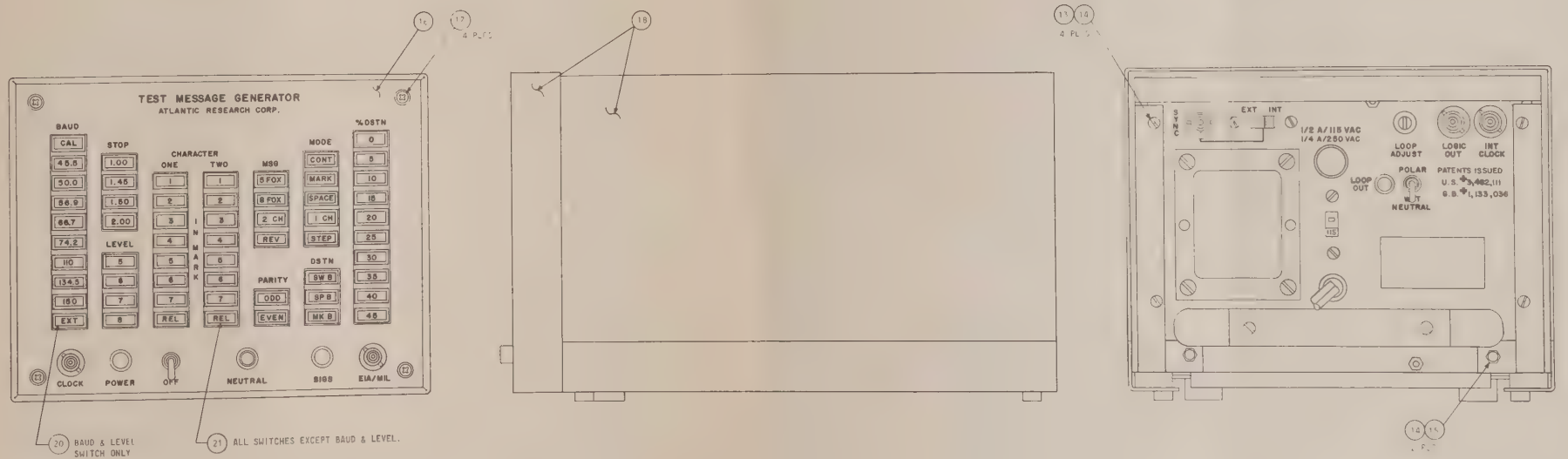
APPROVED FOR ATLANTIC RESEARCH — NAME — DATE — 19
APPROVED — NAME — DATE — 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314

FINAL ASSEMBLY
TMG-10

CODE IDENT NO	SIZE		REV
95335	D	TP-FA-41834676	A LTR
SCALE 1:1			SHEET 1 OF 2

DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		



FOR PARTS LIST SEE SHEET 1 OF 2

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL

APPROVAL	BY	DATE
DRAWN	[illegible]	5/19/69
CHECKED	[illegible]	[illegible]
ENGRG	[illegible]	[illegible]
PRO. ENGRG	[illegible]	11-14-69
STRESS		

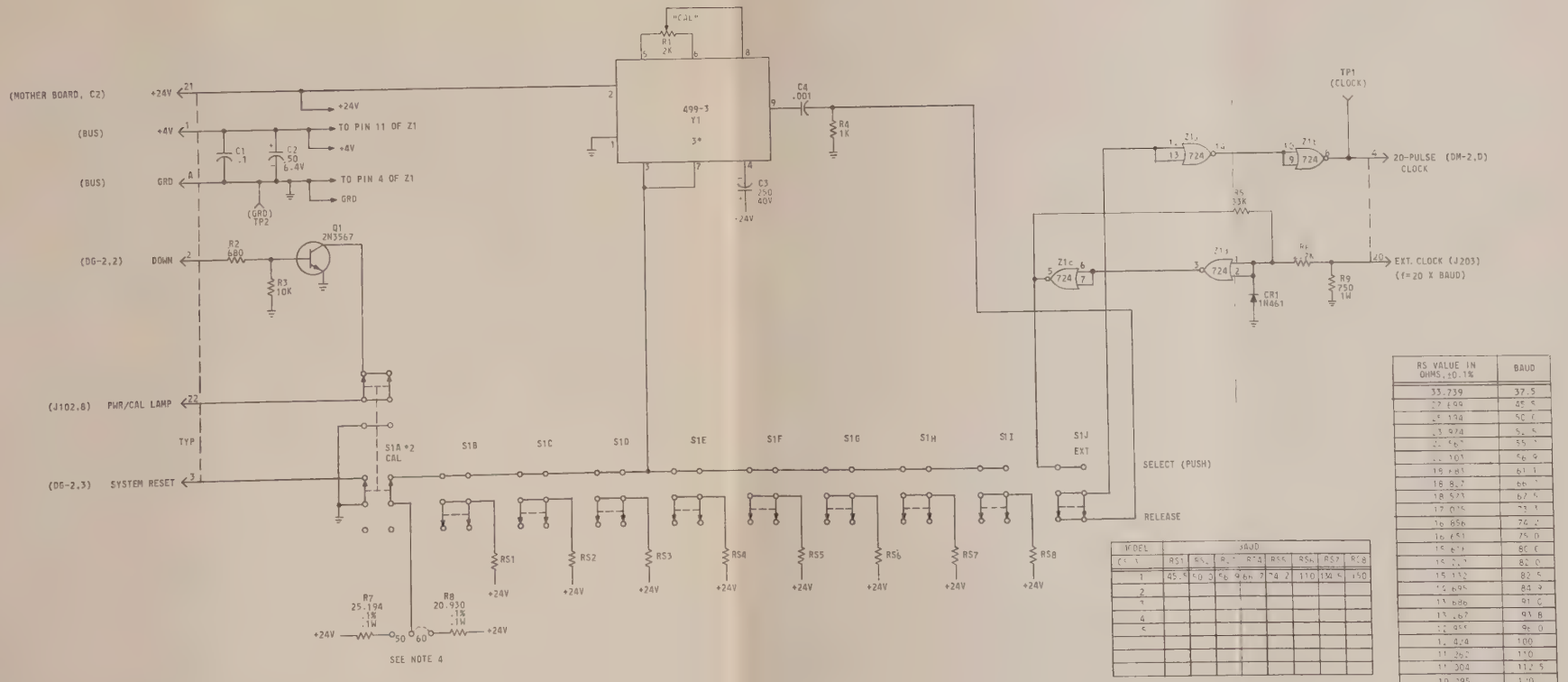
APPROVED FOR ATLANTIC RESEARCH
APPROVED

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314

FINAL ASSEMBLY
TMG-10

CODE IDENT NO	SIZE		REV
95335	D	TP-FA-41834676	A LTR
SCALE 1/1		SHEET 2 OF 2	

DASH NO	NEXT ASSEMBLY	PROJECT
APPLICATION		



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%.
2. THE BAUD SELECT SWITCH IS A MECHANICALLY INTERLOCKED SWITCH, SWITCH S1A IS SHOWN IN ENERGIZED POSITION (PUSHED IN).
3. Y1 IS AN ENCAPSULATED OSCILLATOR MODULE.
4. STRAP 60 IF THE POWER MAINS ARE 60Hz, STRAP 50 IF 50Hz.

MODEL	BAUD							
CS-1	RS1	RS2	RS3	RS4	RS5	RS6	RS7	RS8
1	45.5	50.3	56.9	67.7	74.2	110	134.5	150
2								
3								
4								
5								

RS VALUE IN OHMS, ±0.1%	BAUD
33.739	37.5
37.499	45.5
45.174	50.0
53.974	56.9
56.[illegible]	57.7
60.101	67.7
67.481	74.2
74.833	75.0
74.823	82.0
82.523	83.3
83.333	91.0
91.886	93.8
93.867	96.0
96.955	100
100.420	110
110.240	112.5
112.304	120
120.295	134.5
134.189	135
135.112	150
150.158	

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

	APPROVAL	BY	DATE
	DRAWN	[illegible]	3/13/69
	CHECKED	[illegible]	3/13/69
	ENGRG	[illegible]	11/1/67
	PROJ ENGRG	[illegible]	11-14-69
	STRESS		

APPROVED FOR ATLANTIC RESEARCH _____ 19__
NAME DATE
APPROVED _____ 19__
NAME DATE

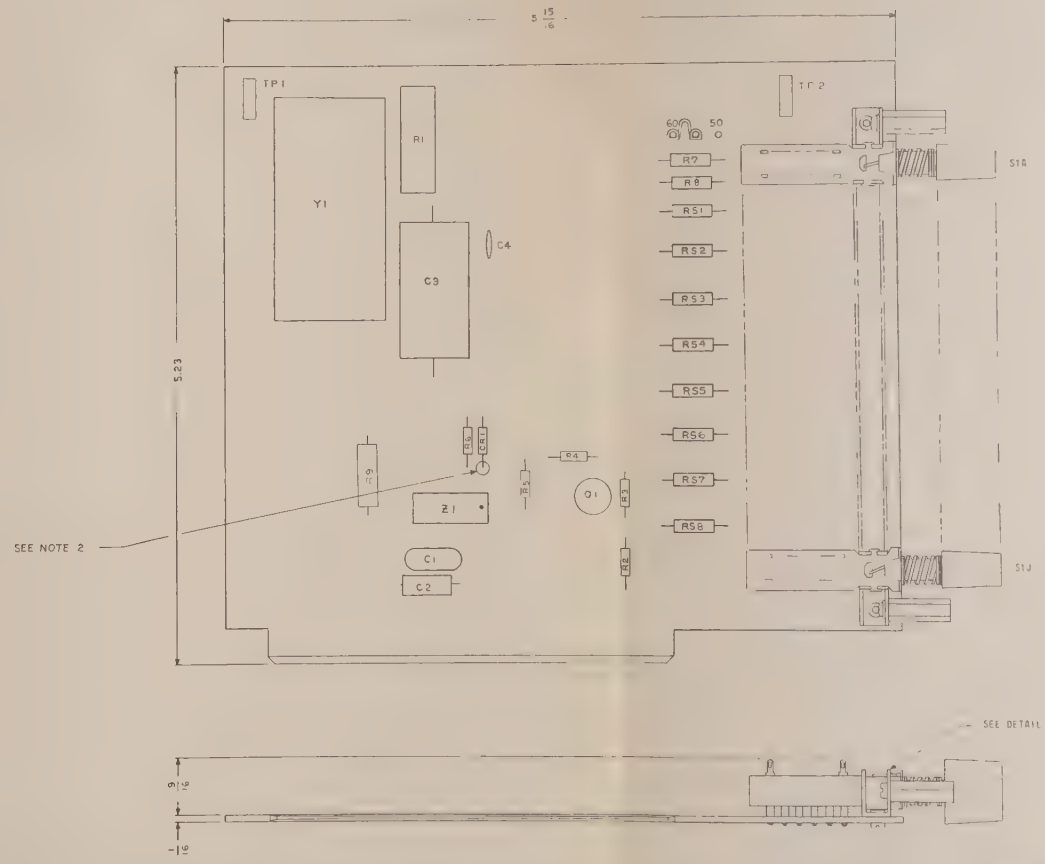
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314

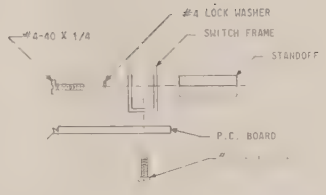
SCHEMATIC DIAGRAM
CLOCK SOURCE
CS-3 (TMG-10)

DASH NO.	NEXT ASSEMBLY	PROJECT
-1	TP-AD-41807686	686

APPLICATION

CODE IDENT NO	SIZE		REV
95335	D	TP-SD-41805686	—
SCALE —		SHEET 1 OF 1	LTR





DETAIL "A"

TABLE I
SWITCH POSITIONS

CS-3-	-1	-2	-3	-4	-5	-6	-7	-8

NOTES:
1. ALL DIMENSIONS ARE REFERENCE.
2. CIRCLE ○ INDICATES CATHODE END OF DIODE.

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ± — —
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL

APPLICATION

DASH NO	NEXT ASSEMBLY	PROJECT
	TP FA 41834676-2	676
-1	TP FA 41834676-1	676

APPROVED
DRAWN
CHECKED
ENGR
PROJ ENGR VIRGINIA 11 14 69
CTRL

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA - 22314

PRINTED CIRCUIT BOARD ASS'Y
CLOCK SOURCE
CS-3 (TMG-10)

SIZE	CAGE CODE	DWG NO	REV
	95335	D TP AD-41807686	—
ALE		SHEET	LTR

CRYSTAL SELECTION CHARTS

TMG-10/DQA-10

BAUD RANGE	MULTIPLIER	STRAP
30 - 78	6,400	64
60 - 156	3,200	32
120 - 312	1,600	16
240 - 625	800	8
480 - 2.5K	400	4

TMG 10 ONLY

BAUD RANGE	MULTIPLIER	STRAP
960 - 5K	200	2
1.92K - 10K	100	1
10K - 50K	20	1 *SEE NOTE 2

DQA-10 PARITY ONLY

BAUD RANGE	MULTIPLIER	STRAP
2.5K - 7.5K	64	64
7K - 15K	32	32
14K - 30K	16	16
28K - 60K	8	8

TO DETERMINE THE CRYSTAL FREQUENCY IN Hz, USE THE FOLLOWING PROCEDURE:

1. SELECT THE PROPER CRYSTAL SELECTION CHART ABOVE.
2. DETERMINE THE MULTIPLIER IN THE CHART AS A FUNCTION OF THE BAUD REQUIRED.
3. MULTIPLY THE REQUIRED BAUD BY THE MULTIPLIER IN NOTE 2 ABOVE. THE RESULTANT NUMBER IS THE CRYSTAL FREQUENCY IN Hz REQUIRED.

	CS-4-1 TMG-10/DQA-10			CS-4-2 TMG-10 ONLY			CS-4-3 TMG-10/DQA-10		
CRYSTAL	FREQ. IN KHz	STRAP	BAUD	FREQ. IN KHz.	STRAP	BAUD	FREQ. IN KHz.	STRAP	BAUD
Y1	291.509	B-64	45.5	352.000	A-32	110	291.509	A-64	45.5
Y2	320.000	B-64	50.0	430.368	B-32	134.49	320.000	B-64	50.0
Y3	361.869	C-64	56.9	480.000	C-32	150	480.000	C-64	75.0
Y4	426.666	D-64	66.7	240.000	D-16	600	256.000	D-32	80.0
Y5	426.666	E-64	66.7	240.000	E-2	1200	264.000	E-32	82.5
Y6	352.000	F-32	110.0	240.000	F-1	2400	307.200	F-32	96.0
Y7	430.368	G-32	134.49	480.000	G-1	4800	320.000	G-32	100
Y8	480.000	H-32	150	960.000	H-1	9600	320.000	H-16	100
Y9	960.000	I-4	2400	1.000.000	*I-1	50.000	480.000	I-16	300

* TERMINAL J CONNECTED TO S1-1, PIN 2. SEE NOTE 2.

NOTES

1. UNLESS OTHERWISE SPECIFIED:
   A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%.
2. TERMINAL J IS USED WITH SPEEDS ABOVE 10,000 BAUD IN THE TMG-10 ONLY.
3. STRAPPING SHOWN CORRESPONDS TO CS-4-1.

REVISIONS				
SYM	DESCRIPTION	DATE	BY	CHK	APPD

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL

APPROVAL	BY	DATE
DRAWN	[illegible]	12/26/69
CHECKED	[illegible]	[illegible]
ENGRG	[illegible]	1/16/70
PROJ ENGRG	[illegible]	2-16-70
STRESS		

APPROVED FOR ATLANTIC RESEARCH ____ 19__
APPROVED ____ 19__

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

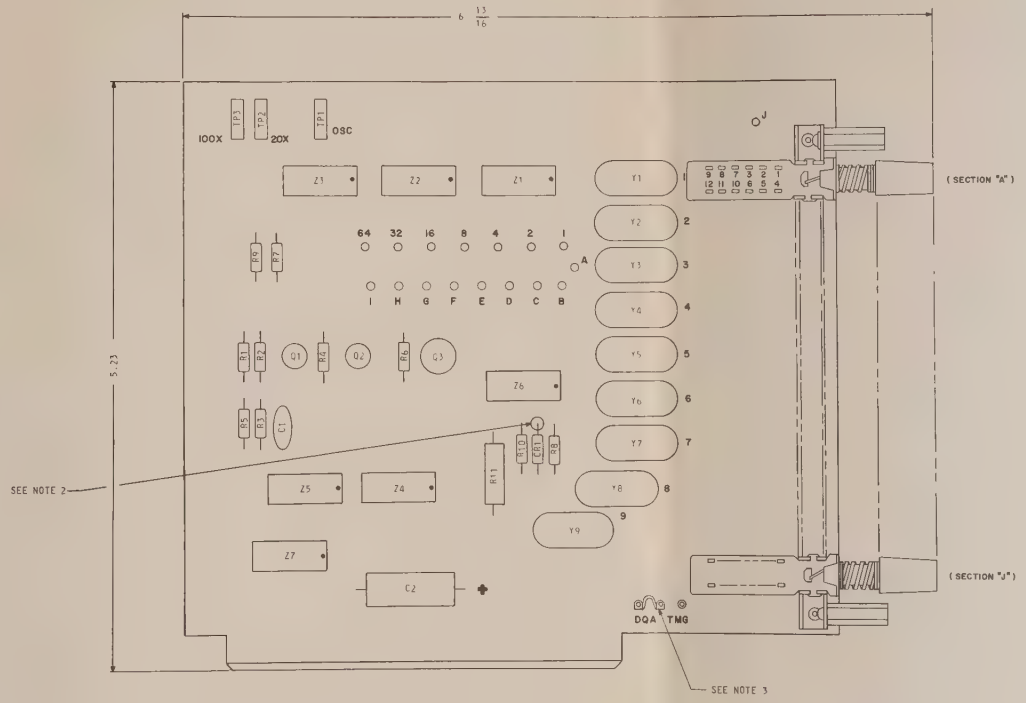
SCHEMATIC DIAGRAM
CLOCK SOURCE
CS-4 SERIES "A"

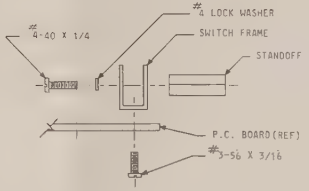
DASH NO.	NEXT ASSEMBLY	PROJECT
	APPLICATION	

CODE IDENT NO.	SIZE		REV
95335	D	TP-SD-41898688	— LTR

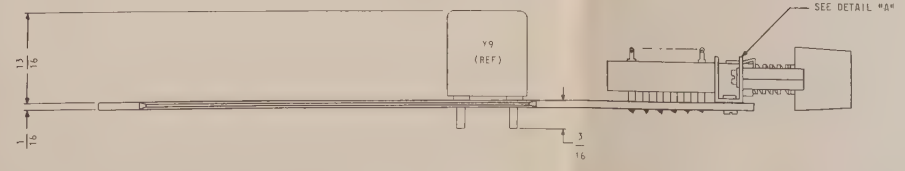
SCALE NONE SHEET 1 OF 1

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD





DETAIL "A"



NOTES:
1. ALL DIMENSIONS ARE REFERENCE.
2. CIRCLE INDICATES CATHODE END OF DIODE.
3. STRAP POSITION SHOWN IS FOR REFERENCE ONLY.

QTY REQD	PART OR IDENTIFYING NO	ITEM NO	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ± ——
FRACTIONS ± ——
2 PLACE DECIMALS ± ——
3 PLACE DECIMALS ± ——
SURFACE ROUGHNESS √

DO NOT SCALE DRAWING

MATERIAL:

	APPROVAL	BY	DATE
DRAWN		E.Tillman	1/29/70
CHECKED		S.JUES	2/16/70
ENGRG		W.Hardy	2/16/70
PROJ ENGRG		[illegible]	2-16-70
STRESS			

APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

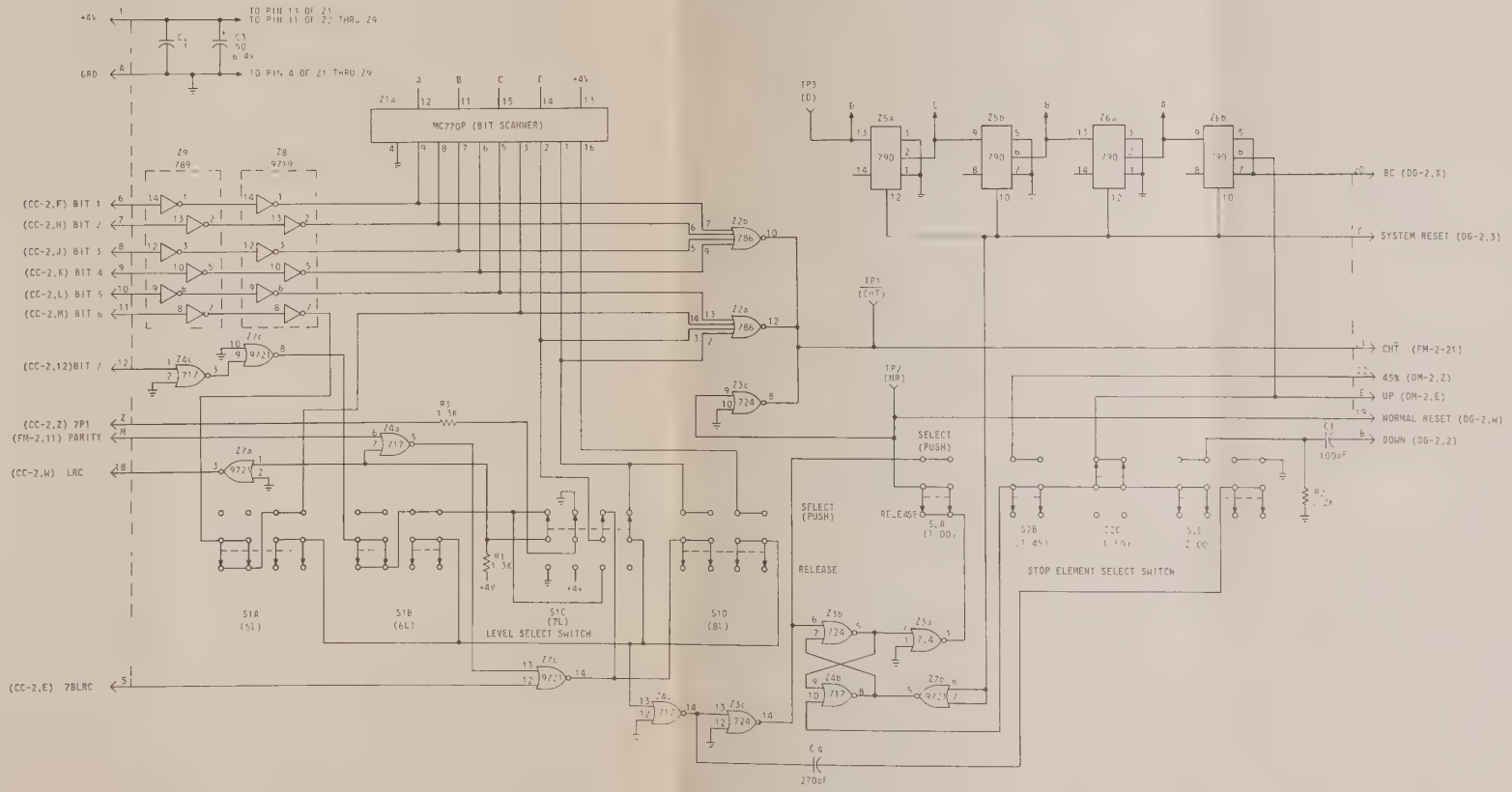
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT.
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA - 22314

PRINTED CIRCUIT BOARD ASS'Y
CLOCK SOURCE
CS-4

CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-41899688	— LTR

SCALE: 2/1 SHEET 1 OF 1

ALL	TP-FA-41834676	TMG-10
ALL	TP-FA-41872690	DQA-10
DASH NO	NEXT ASSEMBLY	PROJECT
APPLICATION		



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   - A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   - B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%.
2. S1, LEVEL SELECT, IS A MECHANICALLY INTERLOCKED SWITCH WITH S1C SHOWN IN THE ENERGIZED POSITION, (PUSHED IN).
   S2, STOP ELEMENT SELECT, IS A MECHANICALLY INTERLOCKED SWITCH WITH S2C SHOWN IN THE ENERGIZED POSITION, (PUSHED IN).

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

APPROVAL	BY	DATE
DRAWN		7/25/64
CHECKED		
ENGRG		
PROJ ENGRG	Hellman	11-14-69
STRESS		

APPROVED FOR ATLANTIC RESEARCH
MARK DATE 19
APPROVED
MARK DATE 19

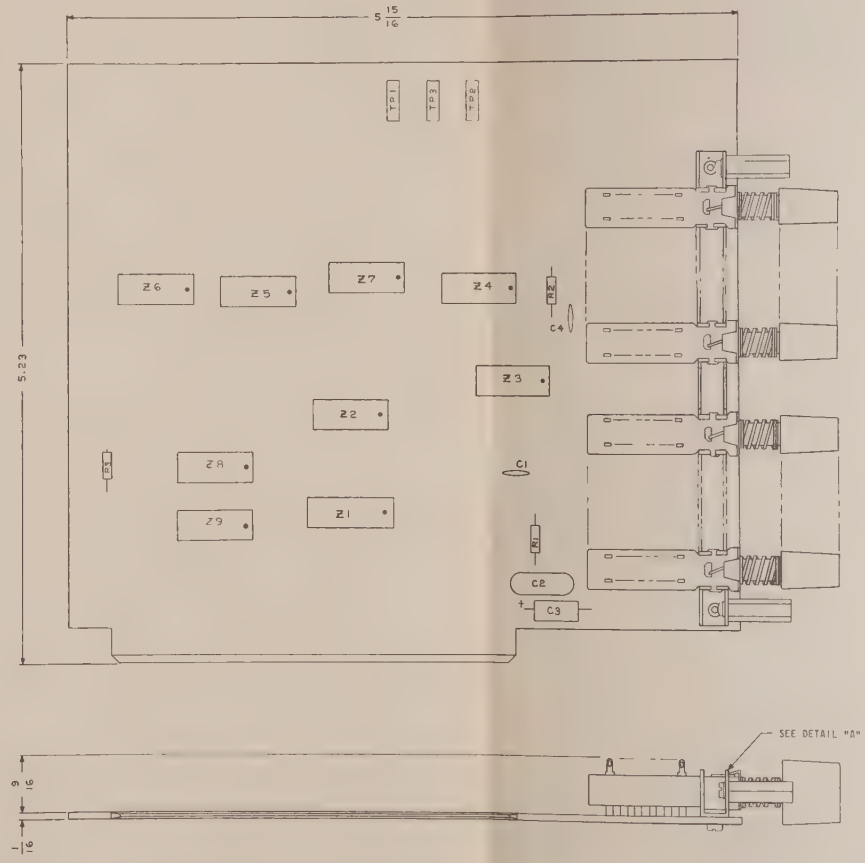
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA 22314

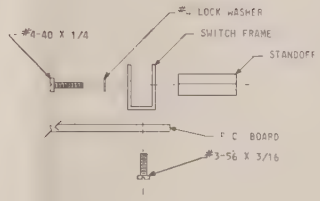
SCHEMATIC DIAGRAM
BIT COUNTER
BC-1 (TMG-10)

DASH NO.	NEXT ASSEMBLY	PROJECT
1	TP-AD-41810676	67b

APPLICATION

CODE IDENT NO	SIZE		REV
95335	D	TP-SD-41808676	-
SCALE —		SHEET 1 OF 1	LTR





DETAIL "A"

NOTES:
1. ALL DIMENSIONS ARE REFERENCE.

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

1	TP-FA-41834676-2	676
-1	TP-FA-41834676-1	676
DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ± ——
FRACTIONS ± ——
2 PLACE DECIMALS ± ——
3 PLACE DECIMALS ± ——
SURFACE ROUGHNESS ——
DO NOT SCALE DRAWING
MATERIAL: ——

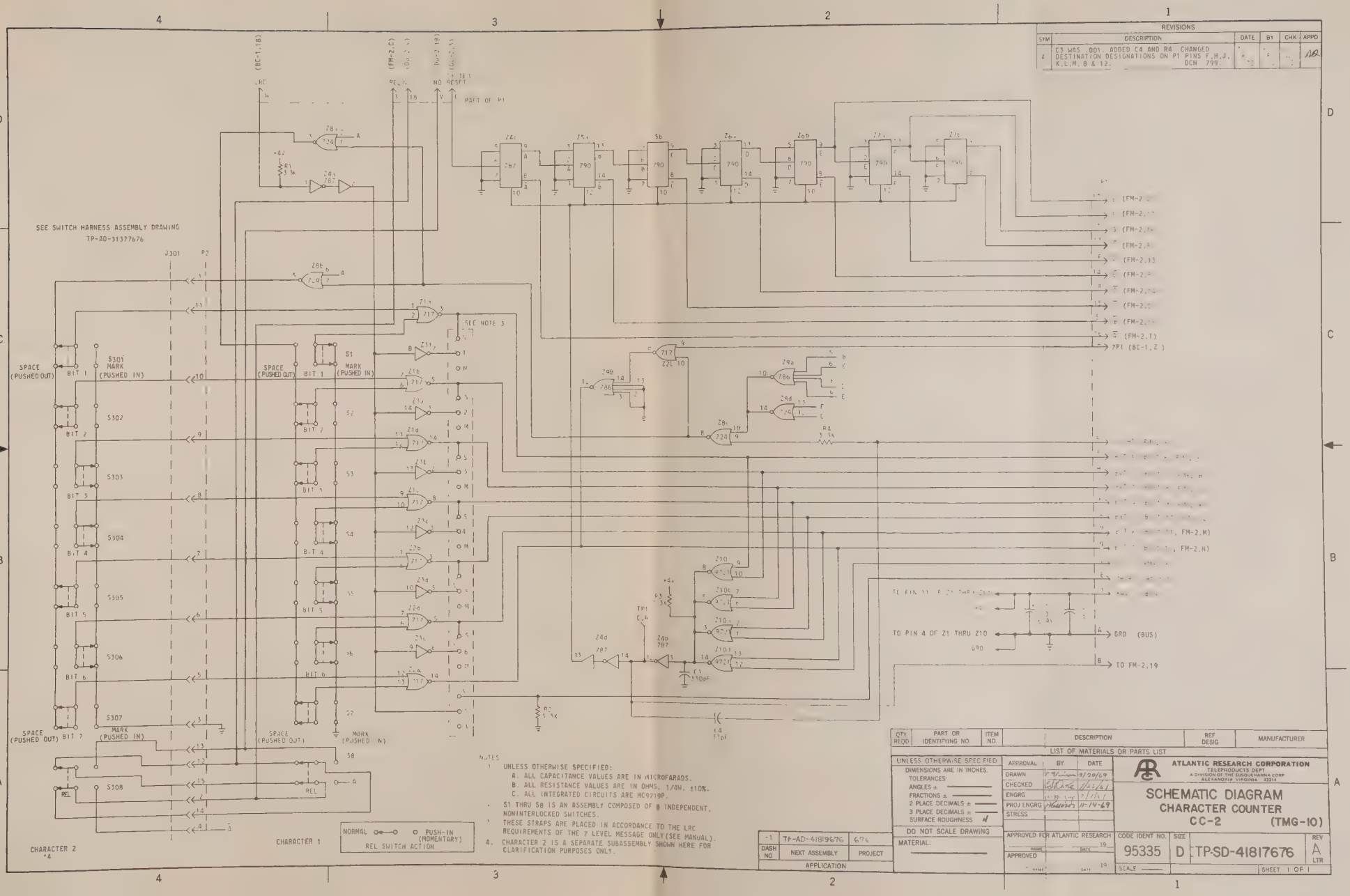
	BY	DATE
APPROVAL		
DRAWN	E Dimon	3/25/69
CHECKED		
ENGRG		
PROJ ENGRG	Acuna	11-14-69
STRESS		

APPROVED FOR ATLANTIC RESEARCH _____ 19__
NAME DATE
APPROVED _____ 19__
NAME DATE

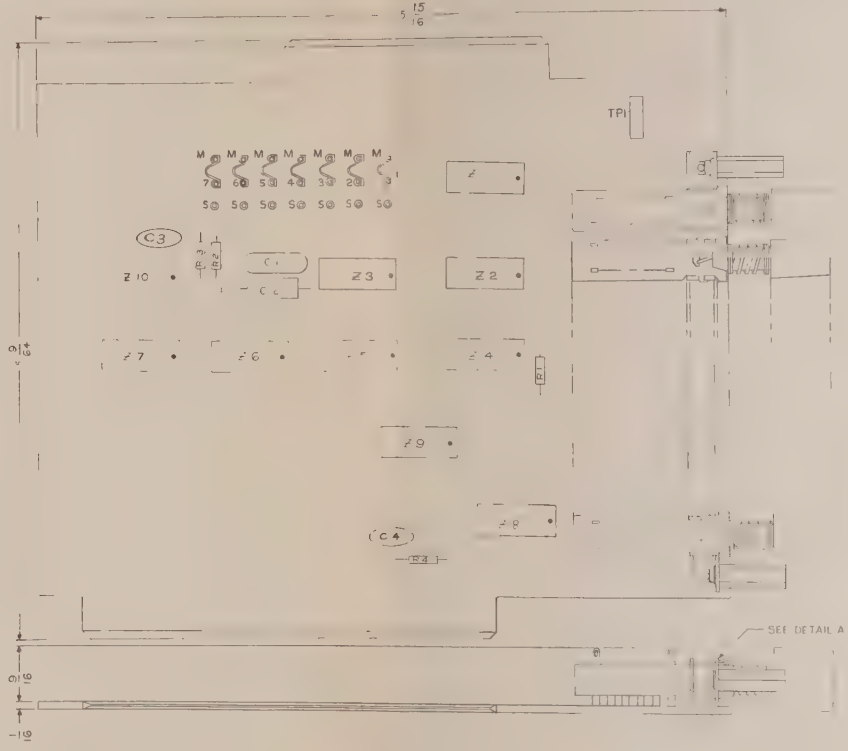
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT.
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314

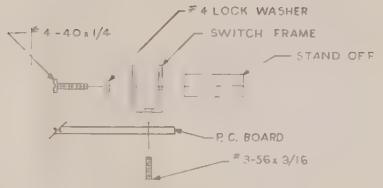
PRINTED CIRCUIT BOARD ASS'Y
BIT COUNTER
BC-1 (TMG-10)

CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-41810676	—
SCALE 2/1		SHEET 1 OF 1	LTR


REVISIONS
SYM | DESCRIPTION | DATE | BY | CHK | APPD
A | C3 WAS .001. ADDED C4 AND R4 CHANGED DESTINATION DESIGNATIONS ON P1 PINS F,H,J, K,L,M, 8 & 12. DCN 799.
SEE SWITCH HARNESS ASSEMBLY DRAWING TP-AD-31377676
J301
P2
SPACE (PUSHED OUT)
MARK (PUSHED IN)
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
BIT 6
BIT 7
S301
S302
S303
S304
S305
S306
S307
S308
S1
S2
S3
S4
S5
S6
S7
S8
REL
CHARACTER 1
CHARACTER 2
*4
NORMAL
PUSH-IN (MOMENTARY)
REL SWITCH ACTION
SEE NOTE 3
TO PIN 4 OF Z1 THRU Z10
GRD (BUS)
TO FM-2.19
NOTES
1. UNLESS OTHERWISE SPECIFIED:
A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%.
C. ALL INTEGRATED CIRCUITS ARE MC9719P.
2. S1 THRU S8 IS AN ASSEMBLY COMPOSED OF 8 INDEPENDENT, NONINTERLOCKED SWITCHES.
3. THESE STRAPS ARE PLACED IN ACCORDANCE TO THE LRC REQUIREMENTS OF THE 7 LEVEL MESSAGE ONLY (SEE MANUAL).
4. CHARACTER 2 IS A SEPARATE SUBASSEMBLY SHOWN HERE FOR CLARIFICATION PURPOSES ONLY.
QTY REQD | PART OR IDENTIFYING NO. | ITEM NO. | DESCRIPTION | REF DESIG | MANUFACTURER
LIST OF MATERIALS OR PARTS LIST
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:
APPROVAL | BY | DATE
DRAWN | 9/20/69
CHECKED | 11/25/69
ENGRG | 7/1/71
PROJ ENGR | 11-14-69
STRESS
APPROVED FOR ATLANTIC RESEARCH
APPROVED
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314
SCHEMATIC DIAGRAM
CHARACTER COUNTER
CC-2 (TMG-10)
CODE IDENT NO. 95335
SIZE D
TP-SD-41817676
REV A
SCALE
SHEET 1 OF 1
-1 | TP-AD-41819676 | 676
DASH NO | NEXT ASSEMBLY | PROJECT
APPLICATION

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	ADDED C4 & R4 DCN 799	1-6-70	R.E.S.	[illegible]	[illegible]





DETAIL A

NOTE:
1. ALL DIMENSIONS ARE REFERENCE

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER
-1	TP-FA-41834676-2	1	[illegible]		
-1	TP-FA-41834676-1	1	[illegible]		

LIST OF MATERIALS OR PARTS LIST

DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS √
DO NOT SCALE DRAWING
MATERIAL:

APPROVAL	BY	DATE
DRAWN	[illegible]	
CHECKED	[illegible]	
ENGRG	[illegible]	
PROJ ENGRG	[illegible]	11-14-69
STRESS		

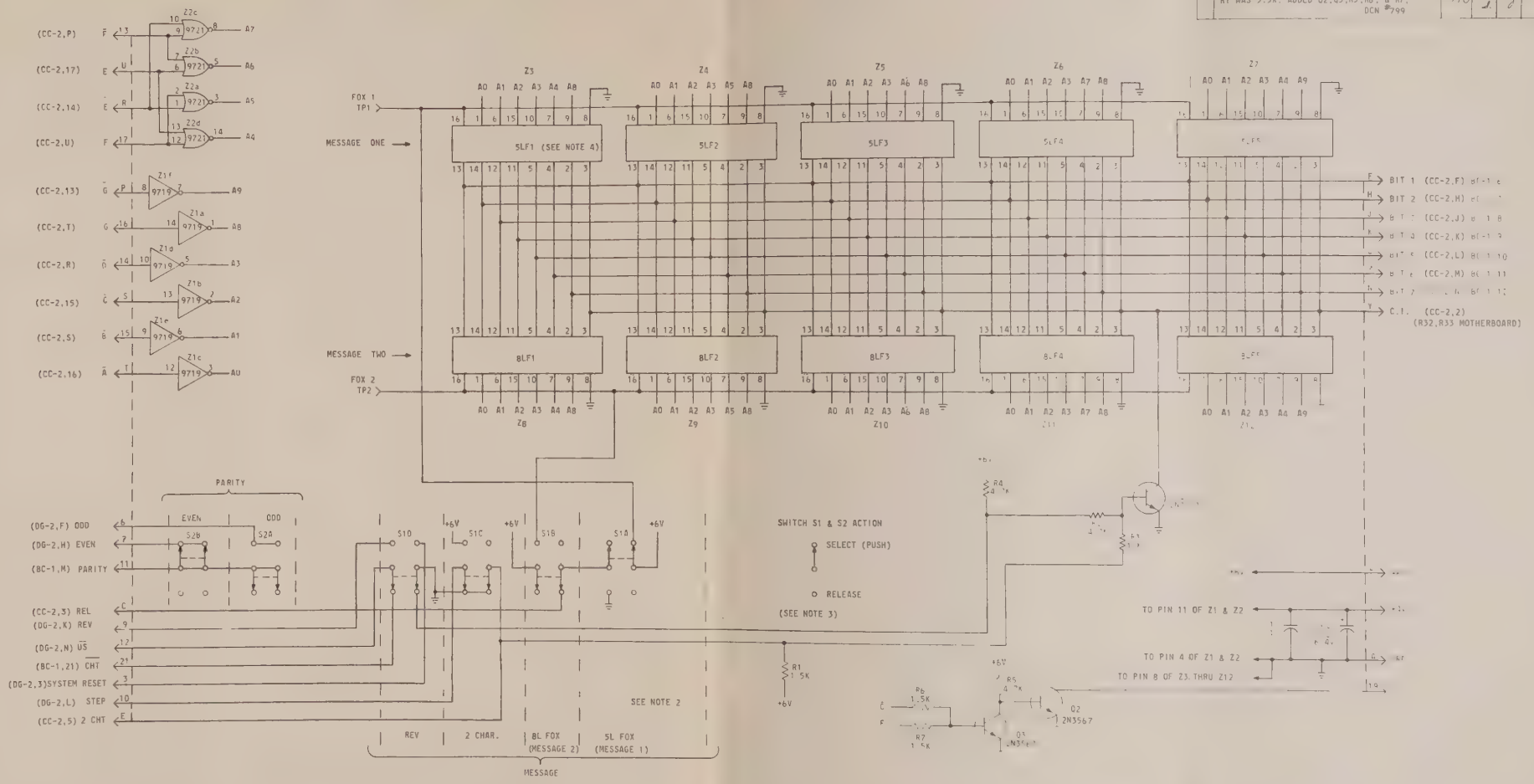
APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT.
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA - 22314

PRINTED CIRCUIT BOARD ASS'Y
CHARACTER COUNTER
CC-2 (TMG-10)

CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-41819676	A LTR
SCALE		SHEET 5 F	

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	CIRCUIT REVISED. CHANGED DESTINATION DESIGNATIONS ON PINS F,H,J,K,L,M, & N R1 WAS 3.3K. ADDED Q2,Q3,R5,R6, & R7. DCN #799	1/, 1/70			



NOTES

1. UNLESS OTHERWISE SPECIFIED:
   A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%
2. 5 LEVEL FOX & 8 LEVEL FOX ARE OPTIONAL MESSAGES, SHOWN FOR CLARIFICATION PURPOSES.
3. S1, MESSAGE SELECT, IS A MECHANICALLY INTERLOCKED SWITCH WITH S1A SHOWN ENERGIZED, (PUSHED IN). S2, PARITY SELECT, IS A MECHANICALLY INTERLOCKED SWITCH WITH S2B SHOWN ENERGIZED, (PUSHED IN).
4. "5LF1" SHALL BE INTERPRETED AS "FIVE LEVEL FOX MESSAGE, MODULE NO. 1".

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL

	APPROVAL	BY	DATE
	DRAWN		3/21/69
	CHECKED		
	ENGRG		
	PROJ ENGRG		11 10 69
	STRESS		

APPROVED FOR ATLANTIC RESEARCH
APPROVED

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA · 22314

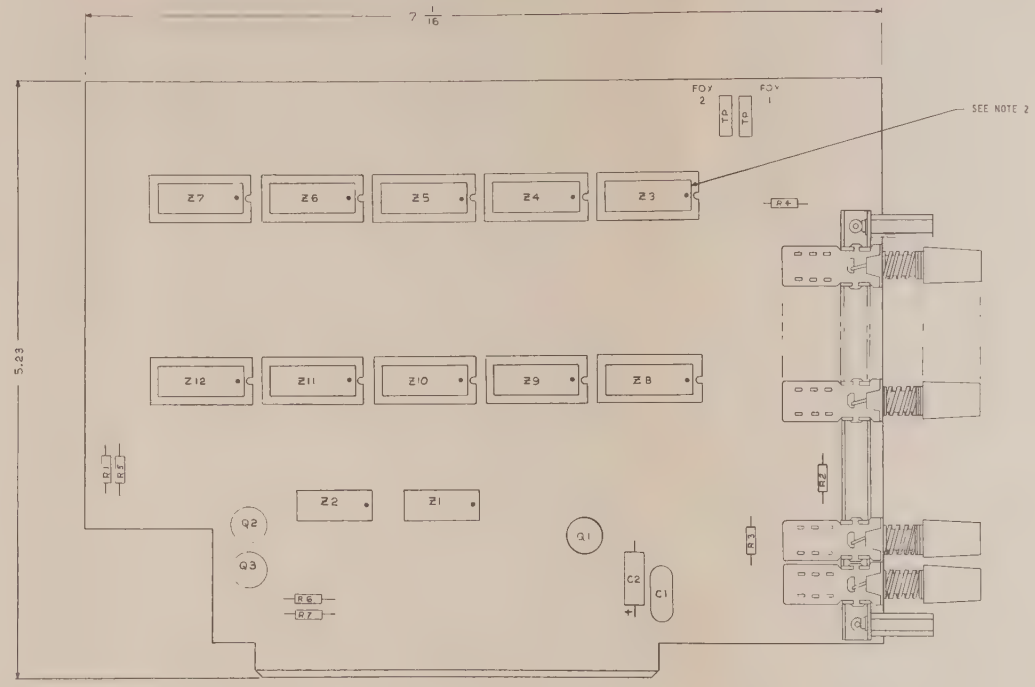
SCHEMATIC DIAGRAM FIXED MESSAGE FM-2 (TMG-10)

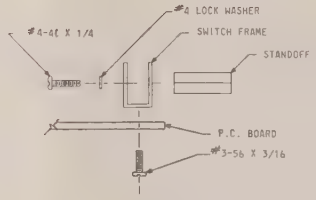
CODE IDENT NO.	SIZE		REV
95335	D	TP-SD-41811676	A LTR

SCALE — SHEET 1 OF 1

1	TP-AD-41813676	676
DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
4	COMPONENTS RELOCATED & RENUMBERED DUE TO CIRCUIT REVISION DCN*799	1/9/70			





DETAIL "A"

NOTES:
1. ALL DEMENSIONS ARE REFERENCE.
2. FIXED MESSAGE IC MODULES, Z3 THROUGH Z12, ARE OPTIONS AND ARE SUPPLIED TO CUSTOMER ORDER

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER
	LIST OF MATERIALS OR PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS 4

DO NOT SCALE DRAWING

MATERIAL:

APPROVAL	BY	DATE
DRAWN	E Wilson	5/22/69
CHECKED	[illegible]	6/25/69
ENGRG	[illegible]	7/1/69
PROJ ENGRG	[illegible]	11-14-69
STRESS		

APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUBQUEHANNA CORP
ALEXANDRIA, VIRGINIA - 22314

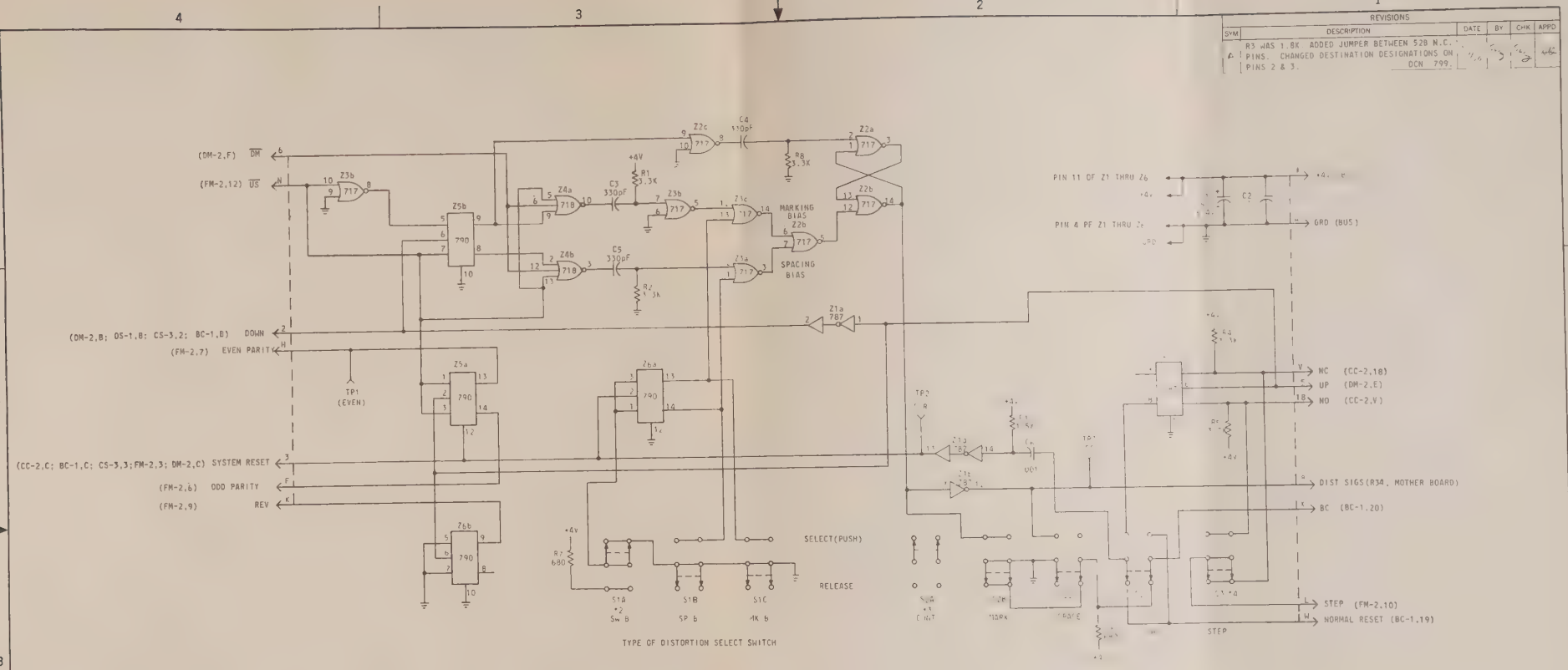
PRINTED CIRCUIT BOARD ASS'Y
FIXED MESSAGE
FM-2 (TMG-10)

CODE IDENT NO	SIZE		REV
95335	D	TP-AD-41813676	A LTR

SCALE : 2/1 SHEET 1 OF 1

DASH NO.	NEXT ASSEMBLY	PROJECT
-1	TP-FA-41834676-2	676
-1	TP-FA-41834676-1	676

APPLICATION



REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	R3 WAS 1.8K ADDED JUMPER BETWEEN 528 N.C.'s PINS. CHANGED DESTINATION DESIGNATIONS ON PINS 2 & 3. DCN 799.				

• NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%.
2. THE "TYPE OF DISTORTION" SWITCH IS A MECHANICALLY INTERLOCKED SWITCH. S1A IS SHOWN IN THE ENGERGIZED POSITION (PUSHED IN).
3. THE "MODE SELECT" SWITCH IS A MECHANICALLY INTERLOCKED SWITCH. S2A IS SHOWN IN THE ENERGIZED POSITION (PUSHED-IN).
4. S3 IS A MOMENTARY CONTACT SWITCH SHOWN IN ITS NORMAL POSITION.

QTY REQD	PART OR IDENTIFYING NO	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS

DO NOT SCALE DRAWING

MATERIAL

APPROVAL	BY	DATE
DRAWN	[illegible]	3/13/69
CHECKED	[illegible]	3/17/69
ENGRG	[illegible]	7/1/69
PROJ ENGRG	[illegible]	11-14-69
STRESS		

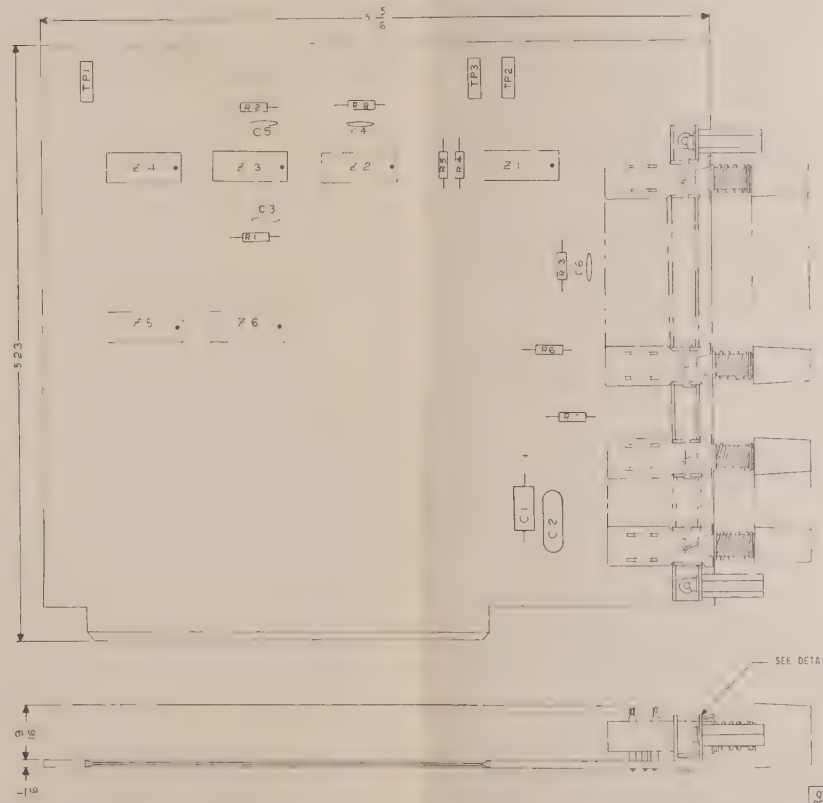
APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

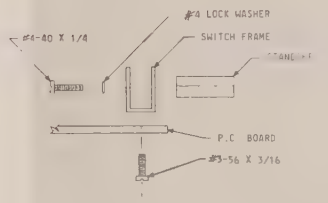
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUBQUEHANNA CORP
ALEXANDRIA, VIRGINIA - 22314

SCHEMATIC DIAGRAM
DISTORTION GATING
DG-2 (TMG-10)

CODE IDENT NO	SIZE		REV
95335	D	TP-SD-41814676	A LTR
SCALE			SHEET 1 OF 1

DASH NO	NEXT ASSEMBLY	PROJECT
-1	TP-AD-41816676	G76
APPLICATION		





DETAIL "A"

NOTE:
1. ALL DIMENSIONS ARE REFERENCE.

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS

DO NOT SCALE DRAWING

MATERIAL

APPROVAL	BY	DATE
DRAWN		3/11/69
CHECKED		6/11/69
ENGRG		7/1/69
PROJ ENGRG		11-14-69
STRESS		

APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314

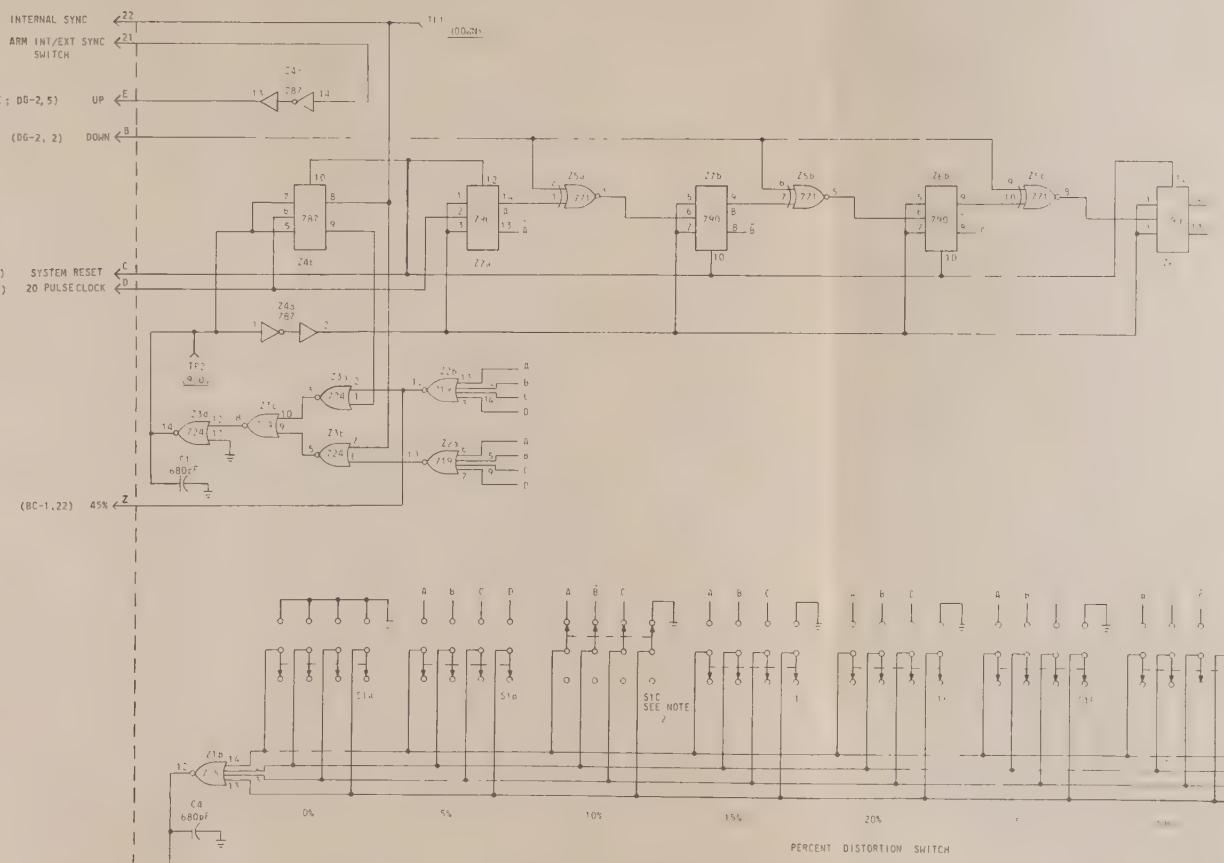
PRINTED CIRCUIT BOARD ASSY
DISTORTION GATING
DG-2 (TMG-10)

CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-41816676	—

SCALE 2/1 SHEET OF 1

DASH NO	NEXT ASSEMBLY	PROJECT
-1	TP-FA-41834676-2	TMG-10
-1	TP-FA-41834676-1	TMG-10

APPLICATION



NOTES: UNLESS OTHERWISE SPECIFIED

1. CAPACITOR VALUES ARE IN MICROFARADS.
2. THE PERCENT DISTORTION SWITCH IS A MECHANICALLY INTERLOCKED SWITCH. STC IS SHOWN IN THE ENERGIZED POSITION (P. [illegible] 14)

REVISIONS

SYM	DESCRIPTION	DATE	BY	CHK	APPD
C	IC #23d WAS 23b DCN #799	[illegible]	[illegible]	[illegible]	[illegible]

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING

MATERIAL

APPROVAL	BY	DATE
DRAWN	[illegible]	3/11/69
CHECKED	[illegible]	[illegible]
ENGRG	[illegible]	[illegible]
PROJ ENGRG	[illegible]	11-14-69
STRESS		

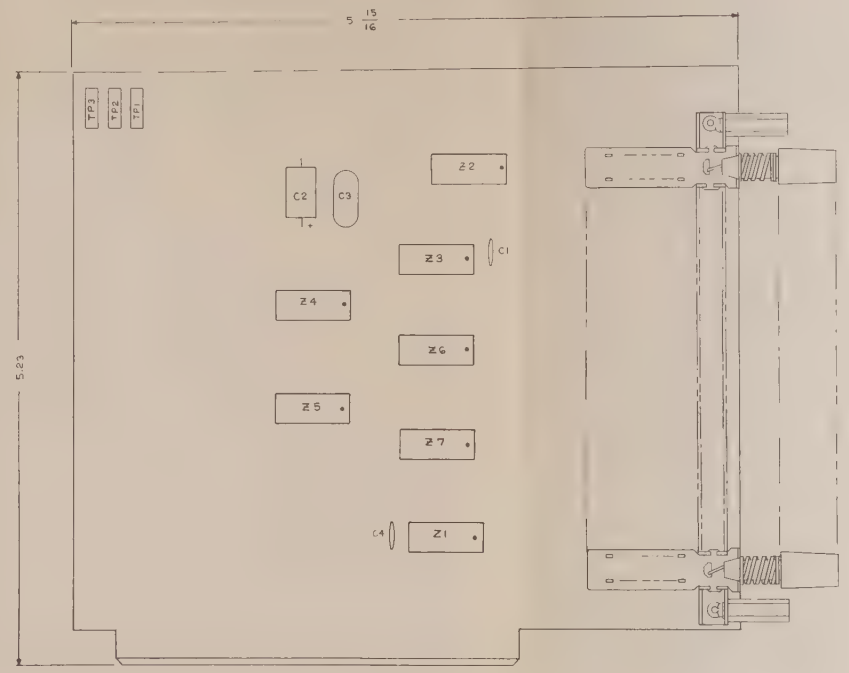
APPROVED ATLANTIC RESEARCH 19
APPROVED 19

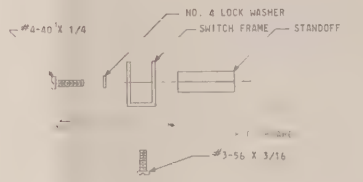
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA - 22314

SCHEMATIC DIAGRAM
DISTORTION MARKS GENERATOR
DM-2 (TMG-10)

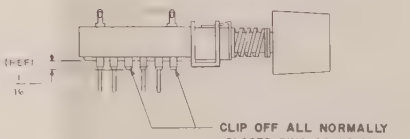
DASH NO	NEXT ASSEMBLY	PROJECT
1	TP-AD-41816276	676
APPLICATION		

CODE IDENT NO	SIZE		REV
95335	D	TP-SD-41823676	A LTR
SCALE			SHEET 1 OF 1





DETAIL "A"



DETAIL "B"

NOTE:
1. ALL DIMENSIONS ARE REFERENCE

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER
1	TP-FA-41834676-2	TMG-10			
-1	TP-FA-41834676-1	TMG-10			
DASH NO.	NEXT ASSEMBLY	PROJECT			

LIST OF MATERIALS OR PARTS LIST

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ± .
3 PLACE DECIMALS ±
SURFACE ROUGHNESS

DO NOT SCALE DRAWING

MATERIAL

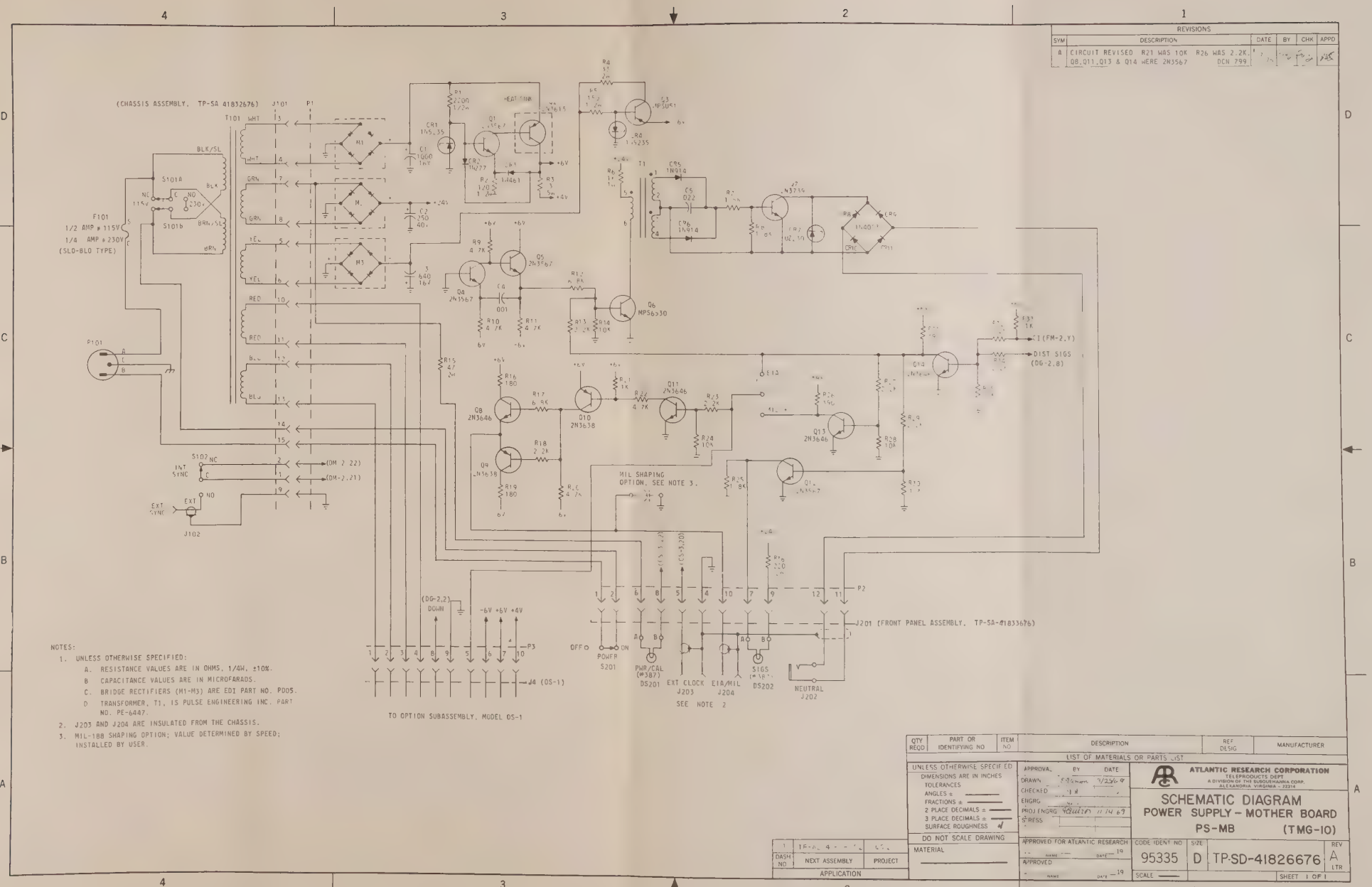
APPROVAL	BY	DATE
DRAWN	E. Wilson	5/28/69
CHECKED		
ENGRG		
PROJ ENGRG		11-14-69
STRESS		

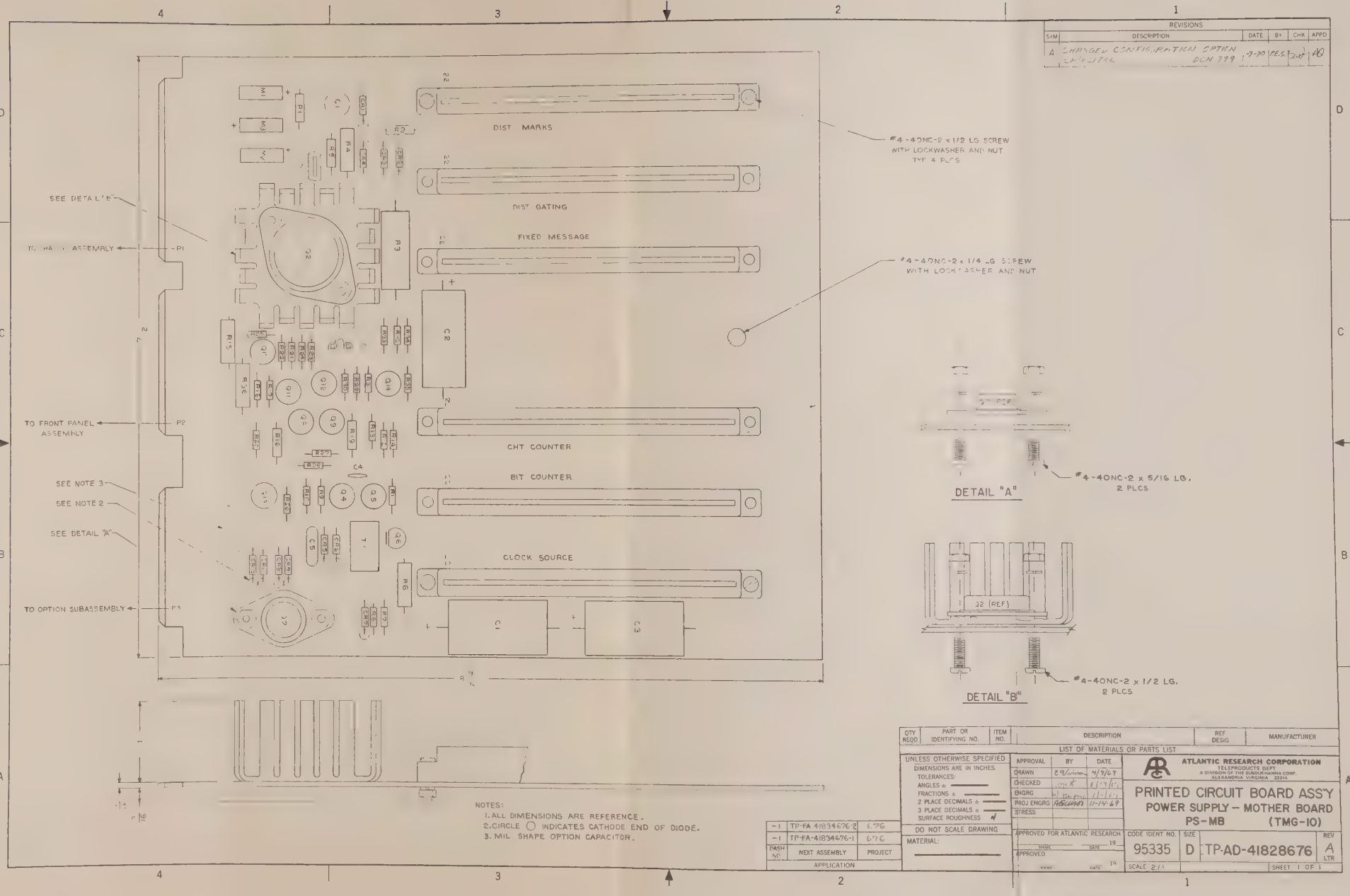
APPROVED FOR ATLANTIC RESEARCH _____ 19__
NAME DATE
APPROVED _____ 19__
NAME DATE

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA VIRGINIA 22314

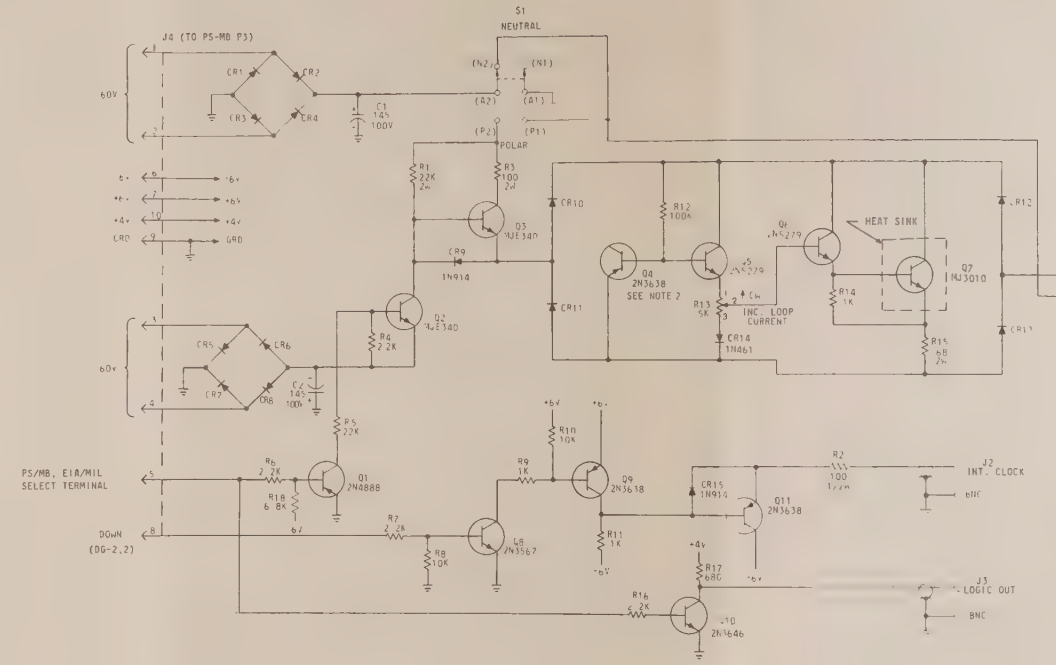
PRINTED CIRCUIT BOARD ASS'Y
DISTORTION MARKS GENERATOR
DM-2 (TMG-10.)

CODE IDENT NO	SIZE		REV
95335	D	TP-AD-41825676	—
SCALE: 2/1		SHEET 1 OF 1	LTR


REVISIONS
SYM | DESCRIPTION | DATE | BY | CHK | APPD
A | CIRCUIT REVISED R21 WAS 10K R26 WAS 2.2K. Q8,Q11,Q13 & Q14 WERE 2N3567 DCN 799
(CHASSIS ASSEMBLY, TP-SA 41832676)
F101 1/2 AMP @ 115V 1/4 AMP @ 230V (SLO-BLO TYPE)
S101A
S101B
T101
P101
J101
P1
S102 INT SYNC
EXT SYNC
J102
(DM 2.22)
(DM-2.21)
MIL SHAPING OPTION, SEE NOTE 3.
(DG-2.2) DOWN
-6V +6V +4V
P3
J4 (OS-1)
TO OPTION SUBASSEMBLY, MODEL OS-1
P2
J201 (FRONT PANEL ASSEMBLY, TP-SA-41833676)
POWER S201
PWR/CAL (#387) DS201
EXT CLOCK J203
EIA/MIL J204
SIGS (#387) DS202
NEUTRAL J202
SEE NOTE 2
DIST SIGS (DG-2.8)
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
A. RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%.
B CAPACITANCE VALUES ARE IN MICROFARADS.
C. BRIDGE RECTIFIERS (M1-M3) ARE EDI PART NO. PD05.
D TRANSFORMER, T1, IS PULSE ENGINEERING INC. PART NO. PE-6447.
2. J203 AND J204 ARE INSULATED FROM THE CHASSIS.
3. MIL-188 SHAPING OPTION; VALUE DETERMINED BY SPEED; INSTALLED BY USER.
QTY REQD | PART OR IDENTIFYING NO | ITEM NO | DESCRIPTION | REF DESIG | MANUFACTURER
LIST OF MATERIALS OR PARTS LIST
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL
APPROVALS BY DATE
DRAWN 3/23/69
CHECKED
ENGRG
PROJ ENGRG 11/14/67
STRESS
APPROVED FOR ATLANTIC RESEARCH
APPROVED
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP.
ALEXANDRIA, VIRGINIA - 22314
SCHEMATIC DIAGRAM
POWER SUPPLY - MOTHER BOARD
PS-MB (TMG-10)
CODE IDENT NO 95335
SIZE D
TP-SD-41826676
REV A LTR
SCALE
SHEET 1 OF 1
DASH NO | NEXT ASSEMBLY | PROJECT
APPLICATION


REVISIONS
SYM | DESCRIPTION | DATE | BY | CHK | APPD
A CHANGED CONFIGURATION OPTION DCN 799 7-7-70 PES
DIST MARKS
DIST GATING
FIXED MESSAGE
CHT COUNTER
BIT COUNTER
CLOCK SOURCE
#4-40NC-2 x 1/2 LG SCREW WITH LOCKWASHER AND NUT TYP 4 PLCS
#4-40NC-2 x 1/4 LG SCREW WITH LOCKWASHER AND NUT
SEE DETAIL "B"
TO MAIN ASSEMBLY P1
TO FRONT PANEL ASSEMBLY P2
SEE NOTE 3
SEE NOTE 2
SEE DETAIL "A"
TO OPTION SUBASSEMBLY P3
DETAIL "A"
#4-40NC-2 x 5/16 LG. 2 PLCS
J2 (REF)
DETAIL "B"
#4-40NC-2 x 1/2 LG. 2 PLCS
NOTES:
1. ALL DIMENSIONS ARE REFERENCE.
2. CIRCLE ○ INDICATES CATHODE END OF DIODE.
3. MIL SHAPE OPTION CAPACITOR.
QTY REQD | PART OR IDENTIFYING NO. | ITEM NO. | DESCRIPTION | REF DESIG | MANUFACTURER
LIST OF MATERIALS OR PARTS LIST
-1 TP-FA 41834676-2 676
-1 TP-FA-41834676-1 676
DASH NO | NEXT ASSEMBLY | PROJECT
APPLICATION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: ANGLES ± FRACTIONS ± 2 PLACE DECIMALS ± 3 PLACE DECIMALS ± SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:
APPROVAL | BY | DATE
DRAWN P.E.S. 4/9/69
CHECKED
ENGRG
PROJ ENGRG
STRESS
APPROVED FOR ATLANTIC RESEARCH
APPROVED
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP.
ALEXANDRIA, VIRGINIA 22314
PRINTED CIRCUIT BOARD ASSY
POWER SUPPLY – MOTHER BOARD
PS-MB (TMG-10)
CODE IDENT NO. 95335
SIZE D
TP-AD-41828676
REV A LTR
SCALE 2/1
SHEET 1 OF 1

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	CHANGED DESIGNATION J4 PIN 5. ADDED R18. R6 & R16 WERE 4.7K. Q10 WAS 2N3646 DCN 799	1/7/70			



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   A. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   B. ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, ±10%
   C. ALL DIODES ARE 1N4002
2. 2N3638 SELECTED PER DRAWING TP-TS-21756640, Q4.

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS √

DO NOT SCALE DRAWING

MATERIAL:

APPROVAL	BY	DATE
DRAWN	E. Vernon	3/13/69
CHECKED		
ENGRG		
PROJ ENGRG		11-14-69
STRESS		

APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA 22314

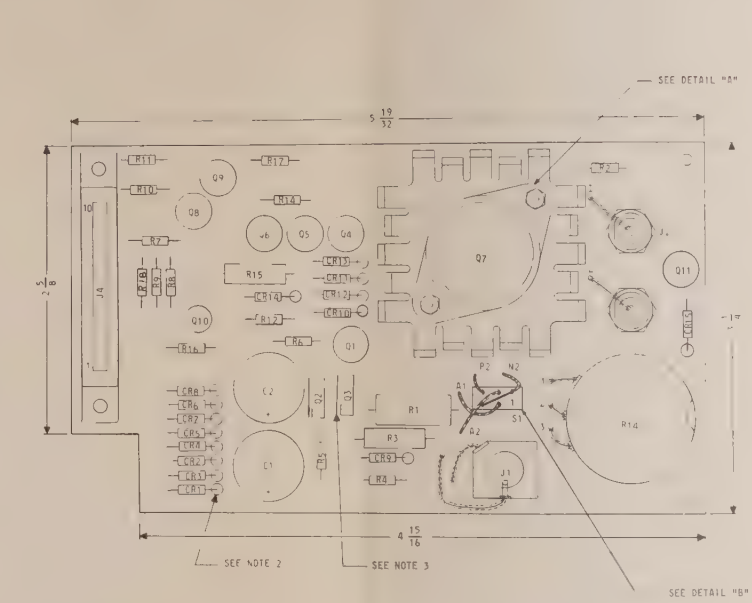
SCHEMATIC DIAGRAM
OPTION SUBASSEMBLY
OS-1 (TMG-10)

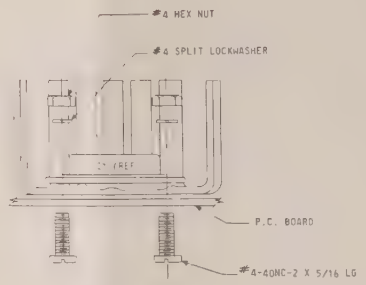
CODE IDENT NO	SIZE		REV
95335	D	TP-SD-41820687	A LTR

SCALE —— SHEET 1 OF 1

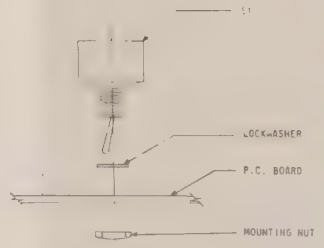
-1	TP-AD-41820687	687
DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	ADDED R18 DCN # 99				





DETAIL "A"



DETAIL "B"

TYP. MTG. FOR J2, J3, R14 & S1.
(SEE NOTE 4)

NOTES

1. ALL DIMENSIONS ARE REFERENCE.
2. CIRCLE ◯ INDICATES CATHODE END OF DIODE.
3. METAL SIDE OF TRANSISTOR MUST FACE REFERENCE LINE ON P.C. BOARD.
4. USE MOUNTING HARDWARE SUPPLIED WITH J1, J2, J3, R14, & S1.

QTY REQD	PART OR IDENTIFYING NO	ITEM NO	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS

DO NOT SCALE DRAWING

MATERIAL:

APPROVAL	BY	DATE
DRAWN		4-4-69
CHECKED		
ENGRG		7-16-69
PROJ ENGRG		11-14-69
STRESS		

APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPT
A DIVISION OF THE SUSQUEHANNA CORP
ALEXANDRIA, VIRGINIA - 22314

PRINTED CIRCUIT BOARD ASS'Y
OPTION SUBASSEMBLY
OS-1 (TMG-10)

CODE IDENT NO	SIZE		REV
95335	D	TP-AD-41822687	A LTR

SCALE: 2/1 SHEET 1 OF 1

DASH NO.	NEXT ASSEMBLY	PROJECT
-1	TP-SA-41832676-2	676

APPLICATION

ACCOPRESS®

25970	YELLOW
25971	BLACK
25972	LIGHT BLUE
25973	DARK BLUE
25974	LIGHT GRAY
25975	LIGHT GREEN
25976	DARK GREEN
25977	TANGERINE
25978	RED
25979	EXECUTIVE RED

GENUINE PRESSBOARD

ACCO USA, INC.
770 S. ACCO PLAZA
WHEELING, IL 60090

83483